BULLETIN

OF THE

AMERICAN GEOGRAPHICAL SOCIETY

Vol. XLII 1910 No. 4

SIR ERNEST SHACKLETON RECEIVES THE CULLUM GEOGRAPHICAL MEDAL

A special meeting of the Society was held at the Engineering Societies' building, on Monday evening, March 28, to welcome Sir Ernest Shackleton and present to him the Cullum Geographical Medal in honor of the great results of his Antarctic expedition of 1907-09. A large number of Fellows and their friends were present. On the platform, with the guest of honor, were President Huntington, members of the Council, Mr. Henryk Arctowski, the meteorologist of the Belgian Antarctic expedition, and Mr. Edwin Swift Balch, one of our leading writers on polar exploration.

The President made the following remarks in presenting the medal to the explorer:

"There is pleasure in acknowledging superiority of achievement by those qualities which are closely allied to all really great action.

"The man to whose character our Society renders its tribute of admiration and respect, who brings to us truth from the secret places of the earth, who, like one other of this great Anglo-Saxon race, has drawn back the veil of ice and cold from polar mystery; this man we welcome to-night, and to him I have the honor to tender the medal of the Society—the highest distinction within our power to give.

"Ladies and gentlemen, I introduce to you Sir Ernest Shackleton, whose home is in England—and in the hearts of all Americans."

Sir Ernest Shackleton, who was most heartily greeted by the audience, replied:

"Mr. President, I thank you for the kind words you have spoken in conferring this great honor upon me. I do indeed feel that I am

at home in America, for I have been made to feel so by the kindness of all whom I have met since my arrival here. This is a great pleasure to me and it will be a pleasure to my countrymen and my comrades who in the Antarctic made it possible for our expedition to win the results for which the American Geographical Society has to-night conferred upon me this distinction. I little dreamed when your Society paid a similar tribute to Capt. Scott, my former leader in the Antarctic, that I also should, some day, receive a medal from your hands. I appreciate the honor with all my heart."

The inscription on the medal is:

"Awarded to Ernest H. Shackleton in honor of his great Achievement in Antarctic Exploration. M C M I X."

The explorer then gave an hour to an exceedingly interesting account of the work of his expedition, illustrated by many stereopticon views. Mr. Balch, in the January *Bulletin,* made a comprehensive summary of the remarkable achievements of the party and, on our platform, Sir Ernest told the story in greater detail. His simple narrative was marked both by modesty and by humor and the audience followed it with the closest attention.

He told of the ascent of Mount Erebus from whose summit clouds of steam and smoke were almost incessantly trailing. The ascent was accomplished in spite of very low temperatures, the most difficult of ice climbing and a fierce blizzard that for over a day, swept down upon the men, keeping them to their tent. At the top, they looked down into the live crater.

Then he described his great southern journey on which he was accompanied by Adams, Marshall and Wild, with four ponies, four sledges and provisions for ninety-one days. It was on this journey, after sledging for eighteen days over the Barrier Ice, that the explorer penetrated more than 400 miles into the Antarctic continent, all the land he saw having been hitherto absolutely unknown. Among the many views of this land, he showed the place where they discovered thick beds of coal, the most remarkable geological find of the expedition.

The party were within 111 statute miles of the South Pole when the approaching exhaustion of the food supply compelled them to turn back. Sir Ernest said that, with fifty more pounds of food, he could have gone to the Pole and back. With the food they had, he could have reached the Pole, but the party would never have returned. As it was, on the return march, they ate their last scrap while still

thirty miles from the supply depôt and then struggled on for a day with nothing but tea to maintain their strength.

The lecture closed with a description of the journey, to the northwest, of the Magnetic Pole party that located the Pole and came back to the sea only to find themselves faced by open water. They were living on seal meat and blubber when the explorer's steamer *Nimrod* fortunately picked them up.

The lecturer was frequently applauded and the favor of the audience was especially indicated when he displayed on the screen the British flag as it floated over the spot that marked his nearest approach to the South Pole.

At the close of his discourse, a reception was given to Sir Ernest, the ladies and gentlemen going forward to the platform where Professor Libby of Princeton introduced them to the President, who, in turn, presented them to the explorer.

SOURCES OF AMERICAN RAILWAY FREIGHT TRAFFIC*

BY

EMORY R. JOHNSON

Professor of Transportation and Commerce,
University of Pennsylvania

To understand the freight services of American railways one must have at least a general knowledge of the sources of traffic. The district and general freight agents and the traffic manager of any particular road must have detailed information concerning the territory served by their lines, and should also possess as broad a grasp as practicable of the resources and industries in all parts of the country. Unless the traffic official be thus equipped, he can hardly hope to serve his company efficiently. Likewise the transportation student, whether he be subordinate employee or executive official, who would so comprehend traffic problems as to be able to offer intelligent suggestions or to issue wise orders must know the transportation geography of his country.

This geographical knowledge necessary to a comprehension of American traffic problems and of the traffic policies followed by our

* See also the Author's Paper "Characteristics of American Railway Traffic: A Study in Transportation Geography," *Bulletin*, Vol. XLI, 1909, pp. 610–621.

railroad companies, like most valuable assets, is not to be gained without careful study. The vast size of our country, the varied character of its resources, the multiplicity of its industries, and the volume and range of domestic trade and foreign commerce require the transportation expert to enrich his mind with a wealth of detail, and to acquire the power of applying his information constructively to aid in the solution of any problem or in the interpretation of any situation with which he may be confronted. He must, of course, know much more than can be presented in this outline of the geography of American railway freight traffic; details must be filled in either by studying books upon economic and commercial geography, or by travel and personal investigation; or, preferably, by both methods.

The railway freight traffic, whose geography we are studying, is grouped by the Interstate Commerce Commission into seven general classes of commodities: products of agriculture, of animals, mines, forests, manufactures, and merchandise, to which is added a residual category including "other commodities." This classification of products shows roughly the extent to which our rail tonnage is drawn from industries connected directly with our basic natural resources—the farms and ranches, mines, and forests—and to what extent from manufactures, of secondary industries. It brings out the fact that, for 1908, fifty-three per cent. of the tonnage is made up of minerals (coal, coke, stone, sand, etc.), not including petroleum which is classed as a manufactured article; that manufactures—not counting in flour, which is credited to agriculture, nor packing-house products which are placed with animal products—now comprise 15.4 per cent. of the traffic; that lumber and other forest products, other than naval stores which are considered to be manufactures, amount to 11⅓ per cent. of the total; and that, despite our prominence in farming, agricultural products, grain and flour, cotton, hay, fruits, and tobacco, together with animal products, live stock, provisions, wool, hides and leather, aggregate less than eleven per cent. of the tonnage handled by the railroads.

Inasmuch as more than two-thirds of the tonnage consists of minerals and manufactures, the section of the United States where those commodities are most largely shipped will be the region making the heaviest contribution to rail traffic; and the portions of the country where grazing, farming, or even forest industries lead, will rank much lower in total tonnage. Indeed, in that relatively small part of the United States north of the Potomac and Ohio rivers and

east of Illinois and Lake Michigan—including only one-ninth of the land area of our country—where mining and maufacturing are most extensively carried on—more than one-half of the total tonnage of our railroads originates; whereas, the southeastern section lying east of the Mississippi and south of the Ohio and Potomac, although a prosperous region having once and a half the area of the northeastern district, and including the West Virginia and Alabama mines, its extensive pine and hardwood forests, and its broad cotton fields, ships only one-eighth of the total tonnage moved by our railroads. The remainder of the United States with 72½ per cent. (nearly three-fourths) of the entire land area, and, with the heavy ore shipments of northern Michigan, Wisconsin, and Minnesota and the bulky lumber traffic of the far Northwest to swell its total, creates less than one-third of the aggregate railroad tonnage. The major share of the freight traffic of our railways originates in a few sections of relatively small area, while over the larger part of the country the tonnage per mile of road and square mile of territory is comparatively small.

A closer view of the sources of our railway freight traffic can be gotten by studying in turn the southern, eastern, central, Cordilleran, and Pacific coast sections of the United States. It will be necessary to limit the study to a review of the principal resources and industries, to some consideration of the markets reached in domestic and foreign trade, and to a general analysis of the traffic of one or more typical railroads in each of the designated regions. It will be well to begin with the Southern States, or the southeastern and Gulf district instead of the northeastern section, because the economic activities of the South are less complex.

The raising of cotton has been the dominant industry of the South for a hundred years; and, although the utilization of mineral and forest resources is broadening the economic life, the growing of cotton and the use of the staple in manufactures now hold and will probably retain first rank. The rapid increase in the number and capacity of cotton mills in the South has latterly added strength to the industrial position of the cotton crop. The cotton belt, extends with widening area from Virginia to Texas and Oklahoma, and occupies the Piedmont of the Carolinas, Georgia and Alabama, the lower Mississippi Valley, with the exception of the lowlands along the Gulf, eastern Texas, most of Arkansas, and parts of Oklahoma, Tennessee and Missouri. This is the heart of the South, the home of most of its population, and, until the recent development of com-

merce and of iron and steel manufactures, it was the theatre of most of its economic life.

The tonnage supplied directly by the cotton crop, however, is not large; for the annual and immensely valuable yield of about 14,000,000 bales weighs only 7,000,000 tons, or about one per cent. of the total railway tonnage of the country; but a crop having a market value of $800,000,000 makes possible and necessary an active traffic in other goods into and out of the region where the crop is grown. Cotton culture directly and indirectly accounts for a large share of the traffic of the southern railways.

Of the 14,000,000 bales of American cotton somewhat more than one-third (5,000,000 bales), and a rapidly rising share, is worked up in our own mills; and the remainder is exported. Thirty years ago the chief center of the cotton production was in the Piedmont and in the other States east of the Mississippi; and in those days the largest interior market was Atlanta. Charleston and Savannah, as well as New Orleans and Mobile, were then important exporting gateways; but with the extension of the cotton belt into the States west of the Mississippi river, particularly into Texas, Houston has become the leading primary market, with Memphis, Fort Worth and Dallas also ranking high. Galveston has gained such a lead over other exporting points that, in 1907, her shipments abroad amounted to about three and a half million bales. New Orleans had second place with two million bales, and Savannah third position with less than one million. There was a short but probably temporary decrease in the cotton exports from Galveston and New Orleans, in 1908, due to the boll weevil.

The decline in rank of the South Atlantic seaports in the cotton export trade has, however, been due not only to the westward movement of the area of production, but also to the rapid rise of cotton manufacturing in the Piedmont section of North and South Carolina, Georgia, and Alabama—the four States in which most of the cotton mills of the South are located. The North Carolina mills require more cotton than is grown in the State; and those in South Carolina provide a market for nearly three-fourths of the home-grown staple. At the present time nearly two-fifths of the cotton spindles in the United States are running in the cotton-growing States, and most of the other sixty-two per cent. are in New England, Massachusetts still having nearly as many spindles as there are in the South; but the ratio is changing, the increase being more rapid in the Southern States.

This survey of the production and distribution of cotton shows that three changes are taking place in the cotton traffic of the southern railroads:—that the tonnage is rising with the rapid increase in the annual crop; that the railways in the western cotton states—those lines converging upon Houston, other Texas markets, and Memphis, and connecting these interior markets with Galveston and New Orleans, instead of the railways in the states east of the Mississippi river—have become the chief carriers of cotton; and that, while the shipments to the seaboard for export grow greater year by year, a larger percentage of the crop is being brought by rail to the mill towns in the Piedmont and by rail and coastwise steamers to the textile centers of New England. The manufacturing progress of the South is causing an increasing share of the raw cotton to be shipped to points within the South; while the shipments out of the Southern States to other parts of the United States and to foreign countries, mainly the Orient, are including a steadily enlarging volume of cotton goods.

Despite the fact that the South is chiefly engaged in agriculture, over half the railway tonnage consists of mineral products, chiefly coal, iron ore, petroleum, phosphate rock, and building materials, coal holding first place. The most productive coal field south of the Potomac and Ohio is the one lying mainly in West Virginia and extending into Virginia, Kentucky, and Maryland. From this district is taken about seven-ninths of the coal mined in the South, some of it being shipped by water down the Kanawha river, but most of it by rail, in part to western markets and more largely to the Atlantic seaboard for further distribution. The output of the rich Alabama field, now one-sixth of the southern coal, is chiefly used locally in the Birmingham iron industries, but is also shipped to other interior markets in the South, as well as to the Gulf ports. It is expected that the Panama Canal will increase the shipment of Alabama coal to and beyond the Gulf seaboard. Kentucky and Tennessee find ready markets for their tonnage within or not far beyond their borders. Texas has some coal, and more is obtained in Missouri, Arkansas and Oklahoma. Taken as a whole, the coal traffic of the southern railways has numerous sources and moves thence in all directions. It is increasing rapidly with the industrial progress of the South.

The all-important iron ore district of the South is close to Birmingham, Ala., where about two-thirds of the southern ore is mined; the other third coming mainly from Tennessee, Virginia and Georgia. The Alabama ore is smelted close to the mine mouth,

and that of the three other states requires but short hauls to reach the furnaces. The iron ore traffic of the southern railways is relatively unimportant in comparison with the tonnage of this commodity handled by the roads in Pennsylvania and about the Great Lakes where most of the crude iron, amounting to more than four-fifths of the total output of the country, and to seven times that of the South, is moved long distances, most largely by joint rail and water routes, but also to some extent by all-rail transportation.

During recent years the southern, and what are usually named the southwestern states have become the source of nearly forty per cent. of the petroleum secured from American wells. Formerly the oil was obtained almost entirely from the northern Appalachian district; later the so-called mid-continent field lying mainly in Oklahoma, and extending somewhat into Kansas and northern Texas, had the largest output; now California comes first, and the Appalachian section third. Three-fifths of the petroleum output of the southern and southwestern states in 1908 came from Oklahoma, and the remainder mainly from Texas, Louisiana, and West Virginia.

As is well known, most of the crude petroleum is transported by pipe lines or by pipe line and tank steamer to the refineries where illuminating oil is prepared, or to the storage tanks of fuel oil; but tank cars as well as pipe lines are used especially in the Louisiana, Texas and California fields. The oil tonnage of the railways is made up chiefly of the refined products which are handled chiefly in bulk in tank cars, although much is shipped in barrels. Many of the numerous by-products are necessarily put into cases or packages for shipment, The services performed by the railroads in transporting oil consist principally of connecting the refineries with the many thousand places where petroleum products are retailed.

The phosphate rock now mined in the United States, amounting to 2,386,000 tons in 1908, is secured from beds in Florida, Tennessee, and South Carolina. The Florida rock, which is two-thirds of the total, is taken from the western part of the central portion of the peninsula, and is shipped as crude rock from Port Tampa mainly to foreign countries. The greater part of the Tennessee output is sent to various parts of the United States for domestic consumption, about one-sixth being exported by way of Pensacola, Norfolk, and Newport News. The South Carolina beds are near Charleston, and the crude rock there obtained is worked up into fertilizers which are distributed widely within and beyond the United States.

The other large source of the traffic of the southern railways—

and it is outranked in tonnage only by coal—is the forests. The forests of the Southern States, which now far surpass the other lumber-producing sections, the northeastern, the Lake States, and the Pacific slope, in the value and quantity of the annual cut, include two separated areas—the yellow pine belt paralleling the Atlantic and Gulf, from North Carolina to Texas and reaching north into Arkansas, and the hardwood belt covering the Appalachian mountains and extending across the states lying to the west-northwest of the mountains. From these forest sources, a fifth of all the tonnage of the southern railways is secured. The pine belt has the larger output, the leading states being Louisiana and Mississippi, but all the Gulf States make large contributions to the total; while Georgia, North Carolina and Virginia are also drawn upon heavily. Practically all of the larger Gulf and south Atlantic seaports have heavy lumber shipments, a part of the product, particularly that of the Gulf ports, being exported while the major share is shipped coastwise for domestic use. An important feature of the rail traffic of the South is the transportation of large tonnages of lumber from the interior to the seaboard.

The great center of the hardwood lumber industry is Memphis. Tennessee stands eighth among the Southern States in value of lumber products; but Arkansas ranks third and Mississippi second. The railroads converging upon Memphis from Tennessee, Arkansas, and northern Mississippi transport large quantities of timber and rough lumber and make that a great milling district, from which the finished product is shipped over a wide territory. Kentucky and West Virginia each produce more lumber than Tennessee does, the output of these States now being marketed, in large part, north of the Potomac and Ohio.

The traffic of the railways in the *northeastern section* of the United States includes such a great variety of commodities and is drawn from so many sources that a discussion of its origin must avoid detail. It will be convenient to consider the northeastern section to include the states north of the Potomac and Ohio and east of Illinois and Lake Michigan; i. e., the first three of the ten territorial groups into which the Interstate Commerce Commission divides the United States in tabulating the mileage, financial and traffic statistics of the railways. By giving these limits to the northeastern section, Ohio, Indiana, and the southern peninsula of Michigan are associated with the East instead of the Central West; but this grouping is fully justified by the close connection of these

trans-Allegheny states with the industrial activities and commerce of the middle and New England States.

The large volume of railway freight in the northeastern district, while derived from many sources and composed of a great variety of commodities, consists mainly of four kinds of traffic: (1) Anthracite and bituminous coal, (2) iron ore and steel products, (3) manufactures of many kinds, especially textiles and machinery, and (4) the export and import trade. By considering the sources and routes of these four classes of traffic we shall account for the greater share—probably four-fifths—of the railway tonnage of this part of the United States.

The coal shipments far exceeed any other class of traffic in tonnage. Nearly half of the tonnage and more than half the value of all the coal mined in the United States is secured in Pennsylvania (200,000,000 tons in 1908); and above six-tenths of the total is from Pennsylvania, Ohio, Indiana and Michigan. Somewhat over one-third of the Pennsylvania coal consists of the anthracite secured from three small areas east of the Allegheny mountains. This coal, both anthracite and bituminous, is distributed generally over the northeastern section of the United States, and is handled mainly by the railroads, the principal exceptions being the shipments coastwise north from Norfolk, Newport News, and Philadelphia, the shipments out of this northeastern part of the United States to the north central section by way of the Great Lakes, and the barging of coal down the Ohio and Mississippi rivers. The great industrial centers, such as the Pittsburg district, and Cleveland, and the metropolitan Atlantic seaboard cities, are the chief centers towards which the coal moves from the northern Appalachian field.

The mineral traffic, comprising nearly six-tenths of the total railway tonnage of the northeastern section, consists mainly of coal, coke, and iron ore. The iron ore is derived in part from the mines of New York, Pennsylvania, and New Jersey and a small amount is imported; but the chief sources of supply for the furnaces and mills of the northeastern states, in which most of the iron manufacturing of the United States is done, are the mines of northern Minnesota and upper Michigan, which are brought close to Ohio, Pennsylvania, and New York by cheap transportation on the Great Lakes. The ore traffic from the Lakes to the furnaces, and shipments of iron and steel and the manifold manufactures thereof from the mills to all parts of the country comprise a volume of freight second in tonnage only to that created by coal and coke.

It is the manufacturing activities of the northeastern states which directly and indirectly account for the heavy railway tonnage of that region. These industries are not only of great variety, but are generally distributed over the larger part of the district; and while railway traffic is largest in such industrial sections as central Indiana, eastern Ohio and western Pennsylvania, southeastern Pennsylvania, northern New Jersey, southeastern New York, and southern New England, the manufactures of other parts of the northeast give rise to no small rail tonnage. Without attempting to enumerate even the more important classes of manufactures, other than iron and steel, mention may be made of machinery and tools which are made in many parts of the section under consideration; of the shipbuilding plants on the Great Lakes and along the Atlantic seaboard; and of cotton, woolen and silk textiles whose mills are located chiefly in the region extending from Portland, Me., to Philadelphia. All of the cotton and silk, and nearly all the wool, used in the textile mills are brought from a distance; and the fabrics and carpets are marketed in every part of the United States, and to some extent abroad. The tonnage of rail traffic directly created by the textile industries is not large; but the concentration of population necessitated by these industries results in a great enlargement of the freight and passenger business of the railroads.

The major share of the foreign trade of the United States, both export and import, being handled through the north Atlantic ports, our foreign commerce contributes an important part of the traffic of the railroads connecting the Mississippi Valley with the seaboard from Portland to Norfolk. The export tonnage, which greatly exceeds that of the imports, formerly consisted mainly of the results of agriculture; but, while the products of our farms—cotton, cereals, fruits, animals, and animal products, etc.—still account for about six-tenths of the value of the commodities we sell abroad, our exports are steadily becoming more diversified with the progress of our manufactures, particularly those of iron and steel which now contribute one-tenth of the total value of our foreign sales.

The export shipments from the United States are more evenly distributed among our several seaports than are the imports; nevertheless one-third of the outbound commerce passed through New York; while Baltimore, Boston and Philadelphia, although outranked by Galveston and New Orleans, handle one-sixth of the exports. Much more than half of our outgoing foreign trade moves through the ports on the Atlantic coast north of Hampton Roads—the ports reached by the trunk line railroads.

The import traffic is more concentrated than are the export shipments. Six-tenths of all our imports enter via New York; and more than three-fourths of the total are brought in through the four largest North Atlantic ports. The commodities imported are of great variety, and consist largely of high class traffic; they are distributed generally over the country, and their transportation is eagerly competed for by the railroads of the northeastern section.

Railway traffic in the *Central West,* that section lying between Indiana and Lake Michigan on the east and the Rocky Mountains on the west, has a higher percentage of products of agriculture than does any other large subdivision of the country. This is the center of the cereal production in the United States, and is the district leading in the value of farm animals. Its principal railroads are popularly called the "granger lines."

These roads converge mainly upon four great centers (there are numerous more local foci), the greatest center being Chicago, or, more broadly considered, the southern and western shore of Lake Michigan. Minneapolis on the Mississippi, the great milling city, and Duluth and Superior, the transfer points at the head of Lake Superior draw to them a large traffic from the upper portion of the central west; while St. Louis, noted for its manufactures and jobbing trade, and Kansas City and Omaha, second only to Chicago in packing-house products, are the two great traffic loci in the southern part of the central west.

But large as is their traffic in grain, animals and animal products, the railways of the central west have a greater tonnage of minerals. Illinois with its 48,000,000 tons of annual output (1908) ranks second among the coal-producing states, while Iowa and Kansas with a combined production of 13,000,000 tons stand ninth and tenth in the list. Eight-tenths of the iron ore of the United States comes from the three states in the Lake Superior district, and while most of this ore is taken by a short rail haul to Lake Superior, it none the less swells the tonnage of the railroads. The mineral traffic of the railways of the central west, mainly coal, iron ore and copper has a tonnage more than double that of agricultural commodities, animals and animal products.

While in the central West, as a whole, manufactures are as yet relatively undeveloped, there are certain sections and numerous cities in which manufacturing is carried on so extensively as to cause the railroads serving them to transport a large tonnage of mill and factory products. Illinois, with its rich coal fields, with

the cheap lake transportation to it from ore mines of the Superior district, with its population of nearly 6,000,000, and its great metropolis of Chicago stands third in the list of manufacturing states. Missouri ranks seventh and Wisconsin ninth. Portions of these three states and some sections of the other commonwealths of the central west have become the home of a large variety of industries whose products are marketed generally over the United States and to a surprising extent in foreign countries.

At the southern end of Lake Michigan is an especially favored location for manufactures. Water-borne ore and near-by coal are brought together cheaply, while more than a score of railroads bring hither, over their converging lines, the natural products of the central west and take hence to all points of the compass the output of mill and factory. Like the Pittsburg district and the section along the south shore of Lake Erie, the Chicago district, within which may properly be included the new city of Gary, Ind., occupies a strategic position industrially, and its rapid progress is creating a vast railway traffic in non-agricultural commodities. A similar influence is being exerted by Milwaukee, Minneapolis, Duluth, St. Louis, and other cities. The traffic of the railways in the upper half of the Mississippi Valley is rapidly becoming diversified, as it flows into and out of an increasing number of industrial centers.

This productive middle portion of the United States located centrally within a broad continent, from 500 to 1,500 miles from the ocean has a surprisingly large volume of trade with our seaboard states and with foreign countries. Highly efficient railroad lines connect it with the Atlantic, the Gulf and the Pacific. Formerly, the Atlantic roads and the lakes carried out most of its exports which consisted chiefly of products of the farm; but now the Gulf route is taken by a large percentage of the cereals, and the Pacific lines also share in the outbound flour and provision tonnage. Meanwhile, the growth of population in the central west, the opening of its coal and iron mines, and the development of its manufactures, have lessened the importance of its exports of agricultural products, have enhanced the volume of manufactures—agricultural and mining machinery, engines, iron and steel, both crude and wrought into wares of many shapes and uses, vehicles of all kinds, etc.—and have enlarged the volume and variety of the commodities brought into the section from other parts of the United States and from abroad. In consequence, the trains that now take the products of the central west to the Atlantic and Pacific return with a profitable

"backload;" and though this can not yet be said of the roads to the Gulf, the northbound traffic is increasing, and will grow more rapidly with the opening of the Panama Canal and with the progress of our trade in Latin-American countries.

In the *Rocky Mountain section,* railway tonnage must always be less than in other parts of the country; although it is probable that most persons underestimate the traffic possibilities of the mountainous and arid West. At the time of the construction of the earlier Pacific roads, the great Cordilleran plateau was regarded mainly as a barrier to be surmounted to reach the traffic of the Pacific coast; but now the interior traffic sources are recognized to be of greater importance. Prosperous roads like the Denver and Rio Grande have depended mainly upon local rather than upon through traffic; and at the present time the northern transcontinental lines derive the larger share of their profits from the traffic of the places along their lines. This is probably not yet true of the southern lines to the Pacific, but even they are prospering increasingly because of the growth of local business.

The internal sources of traffic are the mines, ranches, irrigated districts, and the trade of such collecting and distributing centers as Denver, Salt Lake City, Cheyenne, Helena, Spokane, Albuquerque, El Paso, etc.

Coal naturally leads other minerals in the volume of tonnage; and one sure evidence of the industrial progress of the mountain States is the increase in the amount of coal mined, which has doubled in ten years. Colorado ranks eighth among the coal-producing States and Wyoming twelfth. Five per cent. of the coal mined in the United States, and one-tenth of that secured outside of Pennsylvania, comes from the Rocky Mountain States, not including those on the Pacific coast. More than two-thirds of our copper is mined and smelted in the Cordilleran States, mainly in Arizona, Montana and Utah, the only important copper state outside of this section being Michigan, from which one-fourth of the total output is secured. The mining of gold, silver and lead. likewise, gives rise to an important share of the rail traffic of the mountain district. The mining camps are distributed generally among the Cordilleran States, Colorado holding first place in the output of gold and silver and in the total production of minerals.

The ranches are the second source of the traffic of the railroads in the Cordilleran section. The eight States and territories comprising most of the Cordilleran plateau, Montana, Wyoming, Colo-

rado, New Mexico, Arizona, Utah, Nevada, and Idaho, contain nearly half of all the sheep in the United States; and if the three Pacific coast States, which are largely within the mountain district, be included, the sum is over three-fifths of the total for the country. Montana and Wyoming lead all the other States in number of sheep. The number of cattle in these mountain commonwealths, while not equal to those on the Texan ranches or the farms of Iowa and other Mississippi Valley States, is none-the-less large, amounting to about one-sixth of the total for the United States.

It is, however, the development of irrigation that promises most for the growth of the rail traffic of the mountain States. Such highly fertile sections as the Salt Lake Valley in Utah, the valleys of the Salt River and other streams of southern Arizona and New Mexico, the Imperial Valley of southern California, the Truckee-Carson district of western Nevada, the Uncompahgre Valley of western Colorado, and the irrigated portions of Wyoming, Montana, Idaho, and eastern Washington, these are to be the home of several millions of people and the sources of large railway traffic. The irrigation of those districts in the arid west to which water can be supplied is as yet only well begun; and while the irrigable sections comprise only a small percentage of the total area of the great West, the presence of these highly productive and thickly populated valleys scattered over the wide Cordilleran territory will require an increasing railway mileage and traffic.

Nothing more clearly indicates the increasing railway traffic of the mountain section than does the growth of such cities as Denver and Salt Lake City. Each place is the center of converging and radiating railway systems that unite it not only with the Pacific coast and the Mississippi valley, but also with most parts of the Cordilleran region. These cities and numerous other lesser, but growing, intramontane railway and population centers evidence most clearly the economic progress of the West.

The chief sources of railway traffic in the *Pacific Coast States* are the forests, the grain fields, the fruit farms, the ranches and the mines, and the inshore and deep-sea fisheries. The Alaskan trade and the growing business with the Orient and Mexico are other, though minor, sources. The products from these sources are in part shipped by sea to the Atlantic and across the Pacific; and in larger volume eastward by rail to markets in the Cordilleran, central and eastern sections of the United States. The Pacific seaboard States, which formerly had little commercial intercourse with

other parts of the country, now outrank all other sections in the width of the range of their commerce. The past development of these States has been rapid; but their future growth, aided by the large number of transcontinental railroads in service or nearing completion, by the enlarging markets in the mountain States, by the cheaper transportation by way of the Panama Canal to the American and European Atlantic seaboards, and by the steady tide of immigrants from Europe, will be even more phenomenal. It is easy to understand why so much capital is now being spent in adding new Pacific lines. The St. Paul was finished in 1909, the Western Pacific from Salt Lake to San Francisco, and the Kansas City, Mexico and Orient to the west coast of Mexico will soon be in operation.

The lumber from the magnificent forests of Washington, Oregon and northern California, is the largest single item of railway tonnage. The market for this lumber is no longer confined to places reached by water carriers, but includes the entire western part of the United States, and, for the most expensive grades, the Eastern States. The rates eastward from the great Northwest are especially low, because lumber is largely handled as a "backload" in cars that would otherwise run empty. Washington is now the leading lumber state, its output being one-twelfth of that for the entire country.

The production of wheat in California and Oregon has declined during recent years with the substitution of intensive for extensive farm cultivation; but in Washington the annual crop is still increasing, that state now ranking sixth in wheat production. All three states are growing increasing amounts of barley, the other important cereal crop of the section, California now having a long lead over all other states in barley production.

In southern California, and in portions of central California, and Oregon, the orchards and vineyards originate the major share of the rail tonnage. The California green fruits are now sold in a well-organized market that includes the entire United States; her canned and dried fruits, wines, raisins, olives, olive oil, and almonds have an even wider sale. Horticulture and viticulture, are the chief sources of wealth in California, and in parts of Oregon. The present large shipments of green and prepared fruits will undoubtedly increase more than proportionally with the growth in the population of the United States. Furthermore, the development of the Pacific coast states in fruit production means that they will have sections containing relatively closely settled communities of prosper-

ous people and the rail traffic, inbound, as well as outbound, will consist largely of high-class, profitable freight.

While California has long since ceased to be preeminently a mining and grazing state, it is second only to Colorado and Alaska in the output of gold, unless, perchance, the mines at Goldfield may have now given Nevada the third place. California is now the ranking State in the output of petroleum, and the market value of the 45,000,000 barrels of this mineral annually obtained from the California wells is nearly equal to the value of the gold yearly mined. For industry and commerce, the petroleum is far more important than the gold. It is used instead of coal in the locomotives, and to a large extent in stationary engines; and it constitutes one of the larger items of railway traffic in the state.

Washington is the only one of the Pacific coast states that has coal enough to be of commercial importance, and its mines have an annual output of less than 4,000,000 tons. The mines of Vancouver, which yield two and a half times this quantity and a product of better quality, are the chief source of the coal used on the Pacific coast. The Vancouver coal, however, is mainly distributed by water and contributes but little to the tonnage of American railways.

The grazing industry in the Pacific coast states, particularly in Oregon and California, is important, although the ranches are giving place to farms. For some time to come, California and Oregon will have surplus wool, sheep and cattle for shipment to other states.

The fisheries of the Pacific coast states and Alaska yield an annual product worth $17,200,000, and constitute an important industry. The salmon catch accounts for over two-thirds of the total value, and formerly this had its chief centers in the Columbia River and the tributaries of Puget Sound, but now the waters of British Columbia and Alaska are more productive, the value of the Alaskan salmons being more than double that derived from the waters of Washington and Oregon. The trade in this fish, both fresh and canned, including the Alaskan product, is handled through the ports of our west coast states, from whence it is distributed generally over the United States.

The rapid growth of the export and import commerce handled at the Pacific ports of the United States has contributed largely to the tonnage and earnings of the transcontinental lines, for the reason that a large share of the exports are brought from the farms of the upper Mississippi Valley, the cotton mills and plantations of the South, and the manufactories of the central West and the East. To an even larger degree, the imports are carried over the Rocky Moun-

tains by rail for distribution throughout the central and eastern sections of the country. This traffic with trans-Pacific countries is large enough to have caused most of the transcontinental railway companies to operate lines of steamers connecting their Pacific ports with the Orient.

The railways that serve our western tier of states derive their traffic from numerous sources; and the indications are that each of the main sources—the industries of the states themselves, the markets of the Cordilleran section, the maritime trade with Mexico, Canada, Alaska, Hawaii, the Orient, and Australia—will contribute an increasing volume of traffic for movement within the Pacific coast states, and across the mountains—to and from the eastern half of the United States. The western railroads have passed the period of doubtful experiment; they rest upon a sure traffic foundation.

The general facts brought out in the foregoing brief survey of the main sources of traffic in the five large physical subdivisions of the United States may be illustrated and their effects noted by a summary tabular analysis of the principal classes of *commodities handled by typical railroad systems* located in different sections of the country. The data presented in the following table are taken from the annual reports of the carriers. The grouping of commodities is that required by the Interstate Commerce Commission.

CLASSIFICATION OF FREIGHT TONNAGE OF TYPICAL RAILROADS
1908

	PENNSYLVANIA RAILROAD CO.	CHESAPEAKE AND OHIO	SOUTHERN RAILWAY	CENTRAL OF GEORGIA	ST. PAUL	ROCK ISLAND LINES	SANTA FE
Total tonnage.....	182,083,103	16,540,833	26,654,389	4,700,841	26,189,853	15,877,646	16,610,910
	PER CENT.	PER CENT.	PER CENT.	PER CENT.	PER CENT.	PER CENT.	PER CENT.
Products of Agriculture.....	5.94	4.56	11.04	22.39	21.537	26.37	22.88
Products of Animals..	1.78	.69	1.22	1.41	6.894	7.92	7.92
Products of Mines....	65.45	70.79	38.77	24.93	28.518	27.82	32.05
Forest Products.....	4.78	10.27	17.76	19.11	12.944	12.26	12.41
Manufactures.....	18.51	5.99	}	}	17.267	17.92	17.95
Merchandise.....	.77	3.18	} 31.21	} 32.16		6.87	
Miscellaneous.....	2.77	4.52	}	}	} 12.840	.84	} 6.79
TOTAL.....	100.00	100.00	100.00	100.00	100.00	100.00	100.00

The sources of the tonnage and the traffic differences of the lines listed in the table are clearly evident. The Central of Georgia, located in the heart of the cotton belt of the South, the Saint Paul in the upper Mississippi Valley, the Santa Fe, and the Rock Island roads in the central and southwestern trans-Mississippi section—the last three systems extending throughout the wheat and corn districts —have a far larger percentage than the other systems do of traffic in agricultural products. Their tonnage of products of agriculture is second only to, and not greatly less than that of mineral products; while the percentage of animal products, in the case of the St. Paul, Rock Island and Santa Fe is from five to ten times that of the other roads.

The percentages for mineral traffic are especially instructive. On all the seven systems, even the two "granger" lines and the transcontinental road, the minerals have a greater tonnage than does any other class of commodities; while on the Chesapeake and Ohio, a prominent soft coal carrier, the mineral percentage is nearly seventy-one. It is evident that the Pennsylvania Railroad, which is the greatest freight carrier in the world, must serve the principal mining and manufacturing section of the United States; 65.45 per cent. of its tonnage consists of minerals, which, together with the manufactures, comprise almost seven-eighths of the company's vast freight traffic. Its coal and coke shipments alone exceed 105,000,000 tons.

The lumber traffic is relatively greater on the two Southern roads than on the others included in the table, because of the large output of the pine and hardwood forests of the Southern States. One-eighth of the tonnage of the "granger" roads and the Santa Fe is lumber, this large traffic being due to scarcity of timber in the prairie states, which are obliged to secure nearly all of their lumber from a distance.

The percentage of manufactures in the traffic of the southern and western railroads is a significant fact. Roads located as the Pennsylvania is will naturally have a maximum tonnage of manufactures, and a coal road, like the Chesapeake and Ohio, a minimum; but the systems which serve regions whose industries until recently, were almost exclusively agricultural, report their tonnage to contain a relatively large percentage—and it is an increasing one—of manufactures. While there are conspicuous instances of the concentration of certain industries in specially favored localities, the evolution of industry in the United States is spreading mills and factories

generally over the country. Cheap and efficient railway transportation makes possible the concentration of industry when that is most economical, and it also enables manufactories to be started in hundreds of places where they otherwise could not exist. The progressive diversification of industry throughout the United States is enriching the tonnage of the railroads with an enlarging percentage of the higher and more profitable classes of freight and is establishing a broader and more stable traffic basis for all our railway systems.

DETERMINATION OF THE HEIGHT AND GEOGRAPHICAL POSITION OF MT. McKINLEY

The Society is indebted to Superintendent Otto H. Tittmann of the U. S. Coast and Geodetic Survey for an advance copy of the Report made to him on a determination of the height and geographical position of Mt. McKinley. This work was done as an incident in the survey of Cook Inlet, on which the Survey is at present engaged. The Report, which is signed by Mr. William Bowie, Chief of the Computing Division, is as follows:

"I have the honor to report that the computation and adjustment of the horizontal and vertical angles to determine the geographic position and elevation of Mt. McKinley, Alaska, have been completed. The resulting position for that mountain, on the Valdez Datum, is

N. Latitude	63°	03′	56.83″
W. Longitude	151	00	41.31

The Valdez Datum is based upon the value of the longitude at the astronomical station in the town of Valdez and the mean of the latitudes observed at three astronomical stations in Prince William Sound, Alaska, and is the datum upon which are based the Coast Charts between Cape St. Elias and the Alaskan Peninsula.

"The resulting elevation of Mt. McKinley above mean sea level is 20,300 feet.

"The above position was obtained from the adjustment of horizontal directions observed from four stations of the Cook Inlet triangulation, three of which were occupied in 1909, while one was occupied the previous year. All of the observations were made by the party under Assistant H. W. Rhodes, commanding the U. S. Coast and Geodetic Survey Steamer McArthur. The angle subtended

at Mt. McKinley was 15° 08′ and the correction to any one direction, as given by the adjustment, was not greater than 11″. It is seen from this that the geographic position is well determined. The nearest point from which the mountain was observed was 204 kilometers (127 miles) while the farthest point from which it was observed was 302 kilometers (188 miles).

"Having found the distance from certain stations to the mountain, its elevation was determined from vertical angles taken at Race Point and Little, two of the stations from which horizontal directions were observed. The two values of the elevation of Mt. McKinley obtained from them are 6179.7 meters and 6194.3 meters. The weighted mean of these two elevations is 6187.5 meters or 20,300 feet. This value is identical with the mean value previously adopted by the U. S. Geological Survey which has superseded the value 20,464 feet given in the Dictionary of Altitudes, published by that Bureau in 1906.

"The coefficient of refraction which was deduced from the observations made in 1894 to determine the elevation of Mt. St. Elias was used in determining the elevation of Mt. McKinley. Its value is 0.083. It was believed to be nearer the truth than the coefficient which was determined from the reciprocal observation made in Cook Inlet in 1909, because those observations were made almost entirely over water, while the lines of the two mountains (Mt. St. Elias and Mt. McKinley) were, for the most part, over land and ice.

"It is believed that the value, 20,300 feet, for the elevation of Mt. McKinley is correct within 150 feet."

THE RETURN OF HALLEY'S COMET

The Weather Bureau of the Manila Observatory has printed a paper* on the return of Halley's comet and the alarm manifested in some quarters over the information that, on May 18-19 the earth will pass through the tail of the visitor. The paper is very instructive and also a plain exposition of the groundlessness of fear with regard to comets in general and particularly as concerns the present return of Halley's comet. The more important information it contains is presented here.

*The Return of Halley's Comet and Popular Apprehensions. By Rev. George M. Zwack, S. J., Secretary of the Weather Bureau. 22 pp. Manila Bureau of Printing, Manila, 1910.

Comets do not differ essentially from the sun and the planets. They are composed of matter such as we are accustomed to and are subject to gravitation and other physical laws. Halley's comet, in particular, is an old acquaintance for it revolves around the sun like the earth and is therefore visible at intervals. Its path is very eccentric and of vastly greater length than that of our earth, so that it needs over 76 years to complete one revolution; but this does not alter the truth that it belongs to the group of cosmical bodies that revolve around our sun. About 75 comets are known to move in elliptical orbits around the sun, some 15 of which have periods of revolution exceeding 100 years, though many others have much shorter periods.

There is also a vast number of comets that are seen only once because their orbits are parabolic or hyperbolic-curves whose branches separate farther and farther. They whisk around our sun at tremendous speed that carries them beyond its controlling force; and passing out into boundless space again they doubtless fall at last under the dominating influence of some sun and become members of its solar system.

From the earliest times to the present, about 700 comets have been recorded of which only about one-fifth were visible to the naked eye. As many as eight have been found in a single year—five in 1909. Such remarkable specimens as the great comets of 1858 and 1882 are rare, nor are they those, as a rule, that approach nearest the earth.

These comets have had their periods of revolution changed, by the attraction of the earth, by amounts measured by weeks, but the earth's even course through the heavens has not been at all affected by the comets. Lexell's comet in 1770 came within 1,520,000 miles of the earth, which was probably the nearest approach; but no effect whatever upon the earth could be detected.

Comets are exceedingly large, but they are also exceedingly flimsy. The head of Enke's comet (which is not a large one) has a diameter of 300,000 miles when it first becomes visible. This diameter diminishes as the comet approaches the sun. The tails of comets are rarely less than 10,000,000 miles long. If these immense bodies had the density of our earth, the effect of their attraction upon the motion of the earth would be very appreciable; but not the slightest effect can be observed. Not one of these comets can have weighed even one two-hundred-fifty-thousandth part of the earth. A comet 40,000 miles in diameter would probably have a mean density of a little less

than one nine-thousandth of that of the air at the earth's surface, or much less than has the residual air in a vacuum tube exhausted by the best air pump. There is no danger that the earth will ever be thrown into new and disastrous paths by the attractive force of a comet.

But is there not danger that some harmful matter may stream into our atmosphere, suffocating every living creature or setting the earth on fire? It has been figured out that, on May 18-19, this year, our earth will probably come within the tail of Halley's comet. The head of the comet will, on that day, be at its closest approach to the earth, over 13,000,000 miles away. But the earth will be mixed up with the tail and what will be the result?

One thing is certain and that is that comets, as a whole, are not luminous by incandescence. The spectroscope tells us that their light is, in part, reflected sunlight, but there is also an emission spectrum which reveals the presence of some gaseous carbon compound that may be cyanogen or some hydrocarbon, if not both. The facts collected have made it perfectly evident that there can be no danger that the comet's tail can set fire to the earth or to its atmosphere.

But what about the gases constituting the tail and their effect upon life? Cyanogen is mentioned as probably a constituent part of comets and it is a poisonous gas. Assuming that the tail is formed of gas or other ponderable matter, some cyanogen, if it is present, would, no doubt be picked up by the earth and remain in the atmosphere. Now as the whole comet is, in mass, perhaps equal to our atmosphere and as the earth would come into contact with only a very small part of it, the head of the comet being 13,000,000 miles away, the quantity entering our atmosphere would be far less than 0.00000001 of 1 per cent. One hundred thousand times this amount would be absolutely harmless, no matter what the gas might be.

However, the argument best calculated to dispel all apprehensions regarding the passage through a comet's tail consists in the fact that the thing actually happened less than a half century ago. According to several astronomers of repute, the earth traversed the tail of the great comet of 1861 at 6 o'clock and 12 minutes a. m. on June 30, 1861, some 300,000 miles within it, and approximately two-thirds of its entire length from the head. Nothing was noticed except a faint luminosity, resembling the zodiacal light, which was seen in the evening of that day. "It is perfectly clear, from all the data known, that Halley's comet, at least at its present return, cannot possibly do

any mischief by either tumbling into the sun or colliding with the earth. Its least distance from the former will exceed 54,000,000 miles; from the latter it will be 13,000,000 miles. As comets have passed unscathed as close as 750,000 miles from the sun, there can be no danger of the present comet falling into it."

The writer then discusses the question of the possibility of the collision of a comet with the sun or our earth. None of the periodic comets is likely ever to fall into the sun unless it be Enke's comet. The period of this small comet (nearly 3⅓ years) is continually shortening, first by 2.5 hours a revolution, but since 1868 by only half that amount. If this state of affairs continues indefinitely, the comet will finally fall into the sun. But there is no prospect of this for many thousands of years. Even if the acceleration of its degree of speed should continue at the present rate, the comet's nearest distance from the sun (perihelion distance), 4,500 years from now, would still be ten times as great as that of the comet of 1882 which passed the sun in safety.

It is different with the non-periodic comets. It is very improbable but still possible that, sometime, one of these wanderers will collide with the sun. The late Prof. Charles A. Young expressed the view that if a comet should actually strike the sun, no harm would be done. Of course, an enormous amount of heat would be generated but, in the opinion of this astronomer, the cometary particles would pierce the photosphere and liberate their heat mostly below the solar surface simply expanding the sun's diameter slightly, and so adding to its store of potential energy about as much as it ordinarily expends in a few hours.

The chances of a collision between a comet and the earth are less than of a comet falling into the sun, so far as relates to comets with non-elliptical orbits, since the diameter of the earth is less than 0.01 that of the sun. It is vastly different, however, with the periodic comets. "The orbits of several of them pass closer to the earth's path than the semi-diameter of their heads. Therefore, provided both the earth and the comet last long enough, the two bodies are bound to come together. But such encounters are extremely rare. Babinet estimates that their likelihood is about one in 15,000,000 years."

The author speaks of the possibility of a collision of the earth with a periodic comet but adds the qualification, "provided both the earth and the comet last long enough." This reservation was suggested by the history of the small comet discovered in 1826 by Biela.

It was a small comet with a period of 6.6 years and its orbit came within a few thousand miles of that of the earth. If they had ever arrived simultaneously at the point of least distance, the earth would have passed through the outer portion of the comet's head. But the comet failed to last long enough. On its third return in 1846, the comet divided into two parts while in full view. When the parts were seen again in 1852 they were about 1,500,000 miles from each other. Since then they have not been seen though they should have reappeared no less than eight times. On the night of Nov. 27, 1872, while the earth was passing the path of the old comet, she encountered a magnificent display of meteors. Similar displays were seen at the usual period of the passage of the comet, in 1885 and 1892.

Of course the nuclei of a comet cannot be solid, for they expand and contract by many thousands of miles. But if the earth were bombarded by the combined energy of the meteors forming the head no living being could survive the ensuing rise in temperature. The ruin would be far greater if there were a head on collision. This would simply mean the end of the world as far as the human race is concerned.

This is bound to happen, sometime, if the earth lasts long enough and comets do not become extinct. But what are the chances? Arago figured out that the chance of any individual comet striking the earth is as 1 to 281,000,000. But all this is nothing to worry about. It takes infinitely less to snuff out the candle of our life than a collision between the earth and a comet. Science tells us that the end of the world as the abode of life is surely coming—and this is infinitely more certain than that the earth will ever be in collision with a comet.

OUTBURST OF THE PEAK OF TENERIFFE

A volcanic eruption of the Peak of Teneriffe began on Nov. 18 last and continued for several days. The world had almost forgotten that this lofty mountain in the Canary Islands, whose summit is often covered with snow, is an active volcano. Many had believed that its fire were almost extinct. Some evidence of life remained, however, for its crater has often given feeble testimony to this fact. But the history of the Peak shows, just as the records of Vesuvius and Cameroon Mountain have shown, that the complete

subsidence of great volcanic forces cannot be inferred from the fact that long periods of time have separated the several eruptions. Large trees were said to be growing in the crater of Vesuvius when the outburst occurred that buried Pompeii; and the great eruptions of the Peak of Teneriffe, since man began to count them, have been about a century apart.

Mr. John S. Fleet writes in the *Geographical Journal* (Vol. 35, No. 1, pp. 59-61) that the people of Teneriffe were somewhat alarmed for some months, last year, before the outburst, by the unusual frequency of small earthquake shocks. Earth tremors, on some days, were continuous for hours. They were felt most on the northwest side of the island near Icod and to a lesser extent, at La Orotava. Finally, on the afternoon of Nov. 18, the residents of La Orotava heard detonations, like the discharge of heavy cannon, at intervals of a minute or less. Tidings soon came that an eruption had occurred near Garachico where the long, northwestern flank of the mountain descends to the sea. Smoke could be seen rising over the intervening hills, the noise of the explosions was heard all night and, in the darkness, the glow of the red-hot lava was reflected on the clouds.

Next day it became clear that the eruption was really in the vicinity of Santiago, which stands 6 miles west-north-west of the peak. A stream of lava about a half mile wide and 8 feet deep was slowly travelling down the valley towards the village. Thereafter reports arrived that another lava flow was proceeding in a northerly direction towards El Tanque, which lies about 2 miles from Garachico. The rate of advance is variably stated but it must have depended largely on the slope and configuration of the ground.

The length of the lava stream flowing towards Santiago is said to have been about 3¾ miles and it advanced about a half mile in 24 hours. Santiago was not invaded and the stream descending towards El Tanque also came to rest.

Later reports say that the eruption took place on level ground not far from Chahorra which is a large crater to the west of the main summit at an elevation of 10,500 feet. The craters from which the November outpouring of lava came are on a fissure running 15° north of west, at an elevation of only 3,482 feet. Many parties have visited the scene of the eruption and have found it easy to get within 400 feet of the craters. The wind, during the early part of the outburst, was persistently from the south and a cone of volcanic ash, 400 to 500 feet high was formed. Clouds of steam and showers of stone were still being projected into the air, but the lava flow seems to have continued only a few days and had nearly ceased on Nov. 26.

The main facts, in brief, are that a new fissure opened low down on the northwest quadrant of the volcano and that the large amount of lava emitted from it took its natural course down the valley towards the sea. All the other parts of the island were protected from the lava flow by the ring-like crater wall that girdles the base of the mountain. There was no loss of life.

Very likely, nothing more of importance will be heard of Teneriffe as a volcano for a long time to come. The island is so accessible that expert students of volcanic phenomena are almost certain to visit Teneriffe to investigate the latest great outburst. It is fortunate, for purposes of comparison, that the series of volcanic eruptions in the islands of the Canary group, including Teneriffe, in the years 1730-36, was made the subject of extended observation by Leopold von Buch and that he recorded the results, at length, in his classical work, "Physikalische Beschreibung der Canarischen Inseln."

The last previous great lava flow from the Peak of Teneriffe occurred in 1798, 111 years earlier. Chahorra was the active center having superseded the summit crater. Nearly a century earlier, in 1706, a great lava flow destroyed the town of Garachico which stands on the coast, about 7 miles northwest of Chahorra.

The only report we have of an eruption, that evidently occurred in 1492, is a mere mention made by Columbus in his day book, when he was on his first journey to America. He wrote that on the nights of August 21-25 "We saw a great fire springing out of the Mountain of Teneriffe."

THE PARKER EXPEDITION TO MT. McKINLEY*

BY

BELMORE BROWNE

As far as our plans were concerned, the pack horse method of approaching Mt. McKinley from the west and north was eliminated by the failure of the earlier efforts in this direction. We also found that a pack train attack from the Tanana side was out of the question on account of the length of time required. We then had to choose between the winter approach with dog teams, and the southern, or motor boat route.

* Professor Herschel C. Parker, adjunct professor of Physics in Columbia University, Mr. J. H. Cuntz of the Stevens Institute of Technology, Hoboken, Mr. Belmore Browne, the mountaineer and writer, and Mr. Herman L. Tucker, of the U. S. Forest Service, left New York late in April for Seattle, whence they will sail for Alaska to attempt the ascent of Mt. McKinley and the survey and mapping of a part of the mountain region around it.

In theory the dog team approach seems to be the best. Travelling over the snow would necessitate leaving the Tanana River in February. The party, reaching the mountain early in the spring would probably be able to drive their dogs to the actual base of Mt. McKinley. With a base camp at a high altitude, the party might then devote several weeks to studying the best route to follow. We, however, were forced to give up this approach as we did not have the time necessary for a winter attack.

We therefore turned our attention to the southern motor boat route on which our plans are based. Entering the Susitna River, from Cook Inlet we will ascend it for over sixty miles in a specially constructed motor boat. On reaching the Chulitna River our party will leave the Susitna and follow the first named river to a point just below the Ruth Glacier. This glacier extends south from Mt. McKinley for 40 miles and forms a broad but rather rough roadway to the big mountain. Our base camp will be pitched at the base of this great river of ice, and from this point we will push our mountain equipment towards Mount McKinley by relays. Our mountain base will be within two easy or one long days' travel of the southern base of the mountain and from here the reconnaissance parties will proceed. This camp will also be the base from which our topographical work will be carried on.

The chief interest of this approach is that no one has been nearer than 15 miles from the mountain on this side. Our party will have the task of locating the great ridges, glaciers, and peaks and mapping them. We believe that the southern face of Mt. McKinley cannot be climbed, and it is swept by avalanches of such size that the very mountains shake under the impact of the thousands of tons of snow and ice that fall from the mighty cliffs. But from our base camp, reconnaissance parties will be able to reach the southwestern and northeastern arêtes and our final attempt will undoubtedly lead along one of these great ridges. For this work we have a mountain outfit unequaled, I believe, in American mountain climbing.

Our tents will accommodate five men and are made of light waterproof material. They have been made to stand the force of mountain hurricanes and are practically wind proof. Our sleeping-bags are necessarily light; but in mountain work the climbers will sleep with their clothes on. The bags consist of a waterproof cover, with a light inner blanket of camel's hair, outside which is a light eiderdown quilt.

In climbing we will use the Swiss braided mountain rope, and, for overcoming the snow slopes, will be provided with both Swiss and English ice axes and ice creepers. The food will be the same as that used in Arctic work: pemmican, erbswurst, raisins, hardtack, tea and sugar. The only cooking necessary will be the boiling of water for making tea, or soup, and for this purpose we are supplied with alcohol and kerosene stoves.

Our mountain clothing is all wool, and includes hoods, gloves and puttees. As many attempted mountain ascents have failed through members of the party freezing their feet, we will wear three pairs of woolen socks in the higher altitudes. Our mountain shoes will be the regulation hob nailed leather shoe for rock and glacier work, and rubber shoe packs fitted with ice creepers will be worn on the mountains.

For determining mountain altitudes, we shall carry two hypsometers, two self-recording barometers and thermometers, one high altitude mercurial barometer and three aneroid barometers, registering respectively 10,,000, 18,000 and 20,000 feet. Minimum thermometers, thermometers, hypsometers, and pocket anemometers complete the list. For map making we will have the regular topographical instruments.

Our method of travel will be by relays, and when a suitable amount of food is gathered at the base of the mountain, reconnaissance parties will be sent out. There will be many difficulties to overcome in this work. While our object is primarily to climb Mount McKinley, our climbing will really begin 40 miles from the summit, and for the entire distance our equipment must be the same as that actually used on the summit.

On reaching the base of the mountain, we will still be confronted by about 17,000 feet of ice and snow climbing. This is an unusual feature in mountaineering, as on all the high peaks of the Himalaya and Andes the actual climbing begins at a high altitude, and a peak of the same height as Mt. McKinley would only carry about 4,000 feet of perpetual snow.

STUDIES ON CLIMATE AND CROPS*

1. Variations in the Distribution of Atmospheric Pressure in North America

BY

HENRYK ARCTOWSKI

In a memoir recently published I have given the results of a comparative study of the variations of annual mean temperatures.† As a continuation of this study I shall examine, in the present paper, the data of annual mean atmospheric pressures, and to make clear the object of these investigations I shall begin with a short summary of the principal conclusions of my work on temperature. These conclusions are :

1. At a given place any excess or deficiency in a yearly mean temperature affects, in the same way, the whole layer of the atmosphere accessible to direct observations. Moreover, it seems that the variations are more accentuated at high-level stations.

2. The climatological anomalies are regional. For long series of observations the curves of lustra means show that minima of certain regions occur at the same time as maxima of other regions. Most probably the length of the cycles differ in different countries, as also do the successive waves in the curves of each station.

3. In Europe there seems to exist a rhythmical oscillation of the isotherms. Utilizing the results of those stations of France, Germany, and Russia, where homogeneous series of observations exist for the period of years 1851 to 1900, I have made maps showing the distribution of the departures of the means of each of the five decades of years from the general means. These maps show that the departures observed in the east and west are generally opposite. In other words, the temperatures are too low in Russia when they are too high in France, and *vice versa*.

From the above statements, it results that it was necessary to solve the problem of compensations before it was possible to know whether changes really exist in the quantity of heat accumulated in the Earth's atmosphere. For this purpose I collected the mean temperatures, for the years 1891 to 1900, for all the countries where meteorological observations have been pursued during those years. For each station I calculated the mean of the ten years, the annual departures from that mean, and the

* The author has come to the United States to pursue here his investigations on changes of climate. His first contribution to this subject was his discovery, 10 years ago, of the former great extension of glaciation in the antarctic regions. He is making a systematic study of climatic and crop data with a view of presenting the various factors that may connect astrophysical phenomena with those of commercial geography. His second paper will treat of variations in the yield of wheat in connection with climatic changes.—The Editor.

† L'enchaînement des variations climatiques, Bruxelles, 1909.

difference between the means of the two lustra. In setting forth these figures on maps I was led to the following conclusions:

4. The temperature of the Earth's atmosphere was higher during the lustrum 1896–1900 than during that of 1891–1895. The difference can, of course, only be estimated, and it seems to be between 0.2° and 0.5° C.

5. The year 1893 was the coldest and the year 1900 the warmest of the decade taken into consideration. It seems that the mean temperature for the globe was at least 0.5 C. higher in 1900 than in 1893.

6. The areas of positive and negative departures, on the annual maps, show that most probably dynamical phenomena in our atmosphere cause extremely slow displacement of waves characterized by a deficiency or excess of heat. I have given the name "thermopleions" to the waves of positive departures, and have called "antipleions" the areas where the temperature is below the normal—that is, below the mean of the ten years. The pleions and antipleions, while changing their forms and positions, can be followed in most cases from one year to another.

Now, as 1893 was precisely a year of maximum sunspots and 1900 was near a year of minimum, it seems that the phenomenon of sunspots is in correlation with fluctuations of the quantity of energy radiated by the sun, and also that the first cause of climatological variations is extra-terrestrial. To arrive at a more definite conclusion, I have examined the curve of the monthly mean temperatures noted at Batavia since 1866. This curve shows that, besides the period of sunspots, other periods, of longer or shorter duration, play a more important rôle in the observed changes of temperature.

On the other hand, as we have seen, besides the extra-terrestrial cause on account of which the terrestrial atmosphere, considered as a whole, does not remain constant, other factors, of a purely geographical order, modify the distribution of excess or deficiency of received radiated heat to such an extent that in the study of observed variations these factors must first be considered.

Leaving, therefore, for the moment, the correlations between the sun and atmospheric phenomena and the manner of formation of the thermopleions, I shall try to make plain the mechanism of the propagation of these changes of temperature.

The established facts show that in all probabilty this propagation is essentially due to changes in the atmospheric circulation. Some of these changes may be rhythmical,* others may be periodical† or progressive. We should know, therefore, the modifications of the velocity and direction of the wind. The anomalies occurring in the distribution of atmospheric pressure may, however, serve as a first approximation. Such anomalies exist even if we take into consideration the departures of lustrum means, as I demonstrated in a paper published over a year ago.‡ In the present paper I shall examine more in detail the annual departures of pressure noted in the United States.

Two hypotheses formulated on the subject of the variations of atmospheric pressure have attracted much attention. According to the first hypothesis, the baro-

* The diagram of the yearly resultants of the direction of the wind at St. Petersburg which I published in my study on the changes of the climate of Warsaw (*Prace matematyczno fizyczne, 1908*) may be cited as an example.

† Such seems to be the case with the wind velocity on mountain-peaks. (Arctowski in *Bull.* Soc. belge d'Astronomie, 1907.)

‡ *Comptes Rendus* de l'Acad. d. Sciences de Paris.

metric gradients between areas of low and high pressure, as well as the ranges of annual variation, increase and decrease progressively during periods of about 35 years. Under the second hypothesis, the climatic anomalies of western Europe are explained by temporary accentuations or diminutions of the Atlantic "centers of action."

It is sufficient to look at the map of annual isobars in Bartholomew's Atlas, which has been reproduced in many publications, to see that the high-pressure belt of the northern hemisphere crosses the United States, and that toward the north, in Canada, along the axis of the continent, an area of high pressure completely separates the Atlantic and Pacific "centers of action" of low barometric pressure. It is evident, therefore, that if really, under the influence of solar phenomena, for example, the atmospheric pressure increases in the region of Iceland, and at the same time diminishes at the Azores, or *vice versa*, and especially if the same thing happens in the same way at the "centers of action" of the Northern Pacific Ocean, the data of the American stations, entirely comprised between these four "centers of action," will give most important information.

I pass now to the main object of this paper.

Utilizing the data collected by Sir Norman Lockyer*, I have inserted on maps the annual departures, from the general means of the years 1876 to 1900, for the following stations:

Jacobshavn, Berufjord, Stykkisholm, Tromsö, Aalesund, Brussels, Ponta-Delgada, Lisbon, Madrid, Aberdeen, Valencia, Duluth, Denver, Galveston, Montreal, Toronto, Washington, Nashville and Mobile.

An important fact to be noted in regard to these maps is the range of possible variations. At Tromsö, for example, the highest mean was in 1897, and the lowest in 1887. The difference between the two values in thousandths of an inch is 0.220. The following figures give, in the order of the stations mentioned above, the corresponding greatest differences:

0.166, 0.220, 0.212, 0.220, 0.169, 0.098, 0.144, 0.136, 0.121, 0.158, 0.203, 0.093, 0.054, 0.096, 0.113, 0.087, 0.089, 0.082, 0.069.

It is only in Lapland, Iceland and Ireland, therefore, that the differences are higher than 0.200, while in the United States the possible range is less than 0.100. It is found, by placing these figures on maps, that the curve embracing the differences higher than 0.150 extends from Denmark toward Scotland, passes downward by the Bay of Biscay into the neighborhood of the Azores, then up again toward Labrador. The curve of the differences 0.100 takes in Spain and the Azores, then mounts toward Canada. In North America the atmospheric pressure varies between much narrower limits than on the Atlantic, and the axis following which the anomalies may be greatest forms an arc, which starts at the high-pressure belt of the Azores and tends toward the North Cape, passing south of Iceland. These facts permit us to presume that the anomalies in the distribution of atmospheric pressure, in the United States, may be directly influenced by those of the Atlantic, as well as Europe may be influenced by them. The annual maps I have traced from the figures of Lockyer's tables in no way contradict this supposition. To get a clear idea of the exact state of things, I supplemented Lockyer's figures by the annual departures published by Frank H. Bigelow, in his report on atmospheric pressure in the United States, and those of the summaries of the *Monthly Weather Review*.

A first approximation is furnished by a detailed study of the data of Table 55 in Bigelow's memoir. Bigelow has subdivided the data of 202 stations in the United

* Monthly Mean Values of Barometric Pressure. London, 1908.

States into groups, and has formed for each group the mean departures for the years from 1873 to 1899. In this way the following table has been formed:

	N. ATLANTIC.	S. ATLANTIC.	LAKE REGION.	W. GULF.	N. PLATEAU.	S. PLATEAU.	PACIFIC.
1876.....	—0.020	—0.002	—0.012	+0.007	—0.020	+0.003	0.
77.....	+ 5	—10	+11	+ 2	— 8	— 9	—12
78.....	—67	—56	—51	—49	—28	—25	—31
79.....	+10	+17	+10	+ 7	—24	— 9	— 4
1880.....	+21	+25	— 6	+13	— 7	— 8	+19
81.....	— 8	—14	+ 2	—15	— 4	—13	— 1
82.....	+20	+13	+ 7	+ 1	— 4	— 1	+ 7
83.....	+31	+18	+15	+15	+18	+11	+16
84.....	— 1	— 8	+ 2	— 6	— 7	— 5	—27
85.....	—33	—31	—20	—12	— 5	+ 8	—15
86.....	— 6	—13	0.	— 9	0.	+ 5	— 2
87.....	— 1	— 2	+ 1	— 5	— 6	— 1	+ 1
88.....	— 1	+ 4	+24	+ 8	+11	+ 4	—16
89.....	—11	—12	+ 8	+ 6	+16	+22	—15
1890.....	— 1	+12	+12	+11	+14	+20	+16
91.....	+15	+ 6	+ 7	+ 1	— 7	— 5	+ 3
92.....	— 8	+ 6	+20	+ 4	+ 8	+ 2	+ 6
93.....	—16	—19	—32	—21	—18	—12	+ 9
94.....	+17	+ 9	—12	+12	— 5	+14	+ 8
95.....	— 8	— 7	—10	+ 6	+10	+12	+ 8
96.....	+10	+15	+ 6	+ 9	+ 5	+ 8	— 4
97.....	+ 8	+ 2	+11	0.	+12	+ 6	+ 7
98.....	— 3	— 1	— 11	— 3	+12	+ 1	— 1
99.....	+11	+ 4	+ 2	0.	— 4	— 3	+ 1

The maps I have drawn with the aid of these figures are most instructive. I take at random those of the years 1888, 1889 and 1890.

The map of 1888 shows that the greatest excess above the normal pressure has been noted in Wisconsin. From this center of hyperpressure the figures diminish towards the Atlantic and Pacific, and, on both sides, in the N. E. and in California, the departures are negative. Drawing the curves of equidepartures for the three years considered, maps are obtained which show that the area of hyperpressure maintained itself during those years, and that its center moved progressively from the Lake Superior region towards the Gulf of California. The highest positive departures for those years are but 0.024, 0.022 and 0.020. This is a matter of small excess in the atmospheric pressure. However, if these figures be compared with the possible range of values, deduced from the differences between the highest and lowest observed means (observe that the departures have been lessened by the fact that they represent the means of a certain number of different stations), it is conclusive that here is a phenomenon which might play an important part in the climatological variations occurring in North America.

The fact of a displacement from N. E. to S. W., which has been established by the preceding example, is not exceptional. On the contrary, an examination of the maps drawn with the aid of Bigelow's table shows the important fact that the areas of excess or deficit pressure generally move from the E. towards the W., from the Atlantic towards the Pacific. In 1877, for example, there was a center of hyperpressure over the Lake region. In 1878 the pressure was abnormally low over the entire United States; still, the wave of hyperpressure seems to have maintained itself, moving westward meanwhile, because the least negative departures are to be found in the plateau region. The figures are—0.028 and—0.025 against—0.067,

which is the mean of the departures of the northeastern stations. Further, this extraordinary minimum, notably lessened, is observed in 1879 in the N. W., and seems to have been pushed there by a positive wave coming from the Atlantic. The

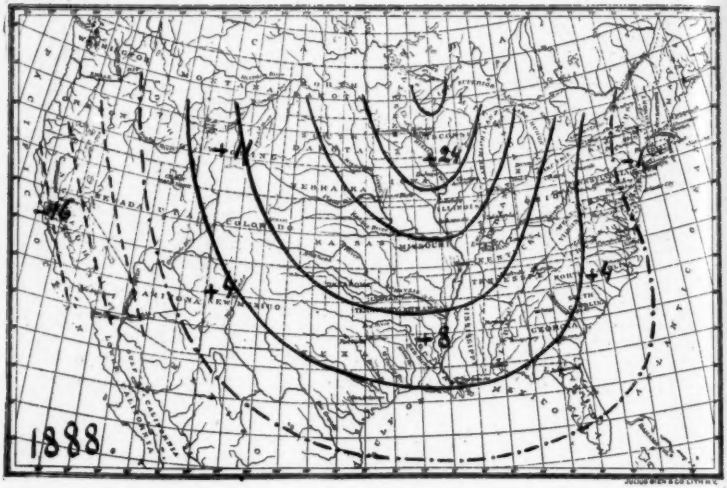

FIG. 1.

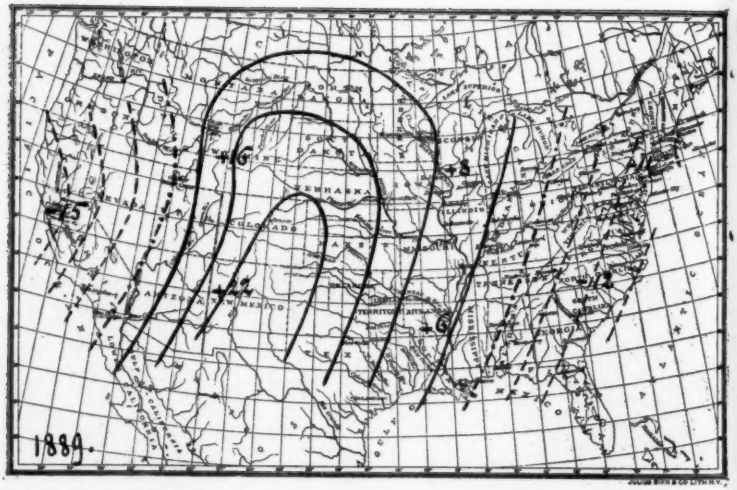

FIG. 2.

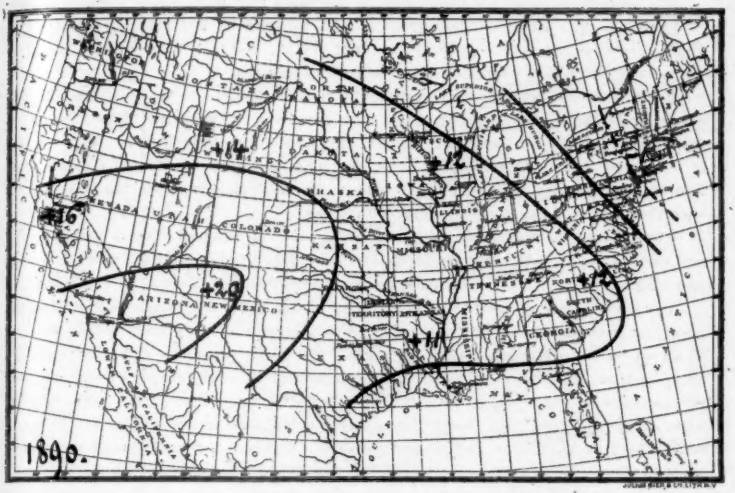

FIG. 3.

maps of which I speak can easily be drawn by using the figures of the above table. I will not dwell longer on this, inasmuch as these maps should be considered suggestive rather than demonstrative.

In order to understand the dynamical phenomena better, I have drawn more detailed maps by using the departures of the different stations. For the maps of the years 1876 to 1899 I have used the figures of Bigelow's tables, and for those of 1897 to 1908 I have used those of the annual summaries of the *Monthly Weather Review*. These maps show that in reality the changes in the distribution of pressure are extremely complicated, and that to thoroughly understand the displacements of maxima and minima which appear from year to year it is necessary to utilize the figures of all available stations. Insufficient comparisons can only lead to vague conclusions, and the real extent of practical conclusions that one has a right to look for, from a deeper study of this subject, is so great that a serious effort to completely solve the problem is justified. The principal difficulty in accomplishing this is the fact that the available figures are far from being perfect.

The maps made from using the departures calculated and published by the Weather Bureau contain many errors which are inevitable, because the departures are taken from means of more or less long series of observations. It is impossible to eliminate this lack of homogeneity if one wishes to use all available data. Then, too, in most cases the stations have been moved from one place to another, some of them several times. Therefore, the corrections which have been applied to render the series homogeneous may have been wrong.

That it may be better understood, I give an example to show the difficulties one has to deal with when the figures are inscribed on the map and one tries to draw the curves of equidepartures.

The departures given for Davenport for the years 1891 and 1892 are, respectively, + 37 and + 51. Those of Dubuque, Chicago, Springfield and Des Moines are, for 1891: + 7, + 10, − 4, − 3; and for 1892: + 16, + 12, + 4, + 4. So the departures of Davenport cannot be taken into consideration.

Even a better example is furnished by the departures + 32, + 20 and + 52 given for Pittsburg for the years 1892, 1893 ane 1894. The maps show us that in reality, instead of the preceding figures, the departures should have been about 0, − 25 and + 5. On the other hand, the map obtained for 1899 by using the figures in Bigelow's tables differs obviously, in many details, from that one made with the figures of the *Monthly Weather Review*.

I am aware that the figures cannot be quite exact, the causes of error being many and various; still, it is worth while to note the fact that the departures are only approximate in order not to draw too many conclusions from a study of the maps.

The study of the geographical distribution of the departures suggests that at each point the phenomenon of the variation of annual pressure is governed by the passage of waves having different centers of origin. To study in a really scientific manner the direction and the velocity of the displacement of these waves, as well as the phenomenon of interferences which must occur, the maps that I have been able to draw are insufficient. But, nevertheless, they are suggestive; moreover, all the particularities can be studied, and all the deductions to which a comparison of the maps lead, may be verified, by using a method of research which I shall outline further on.

There is another point which, notwithstanding its evidence, should especially be noted. The real signification of the fact that an annual mean of the atmospheric pressure is slightly too high or too low cannot be defined. An annual mean may be too low owing to an exceptionally low monthly mean. This monthly mean of a certain locality may be abnormal because of a single barometric depression. This depression will only have influenced the means of stations along its path. On the other hand, there is all the complexity of the seasonal changes of pressure which should be discussed.

Therefore, as the maps suggest the existence of waves whose propagation is so slow as to take two or three years to cross the United States, from the Atlantic to the Pacific coast, it would be most interesting to know how far these waves are independent or, on the contrary, affect the seasonal distribution of atmospheric pressure. Before entering into the details of the suggestions to which the study of the maps give rise, I wish to show by a typical example that without any doubt, in certain cases, we have to do with a phenomenon of propagation of atmospheric waves.

The maps of 1891, 1892 and 1893 show the displacement of a maximum whose center, in 1891, was on the Atlantic, N. E. of the New England States; in 1892 it had reached the States of Wisconsin and Minnesota, while in 1893 it had moved on, beyond the Rocky Mountains and Pacific Coast, to the west of San Francisco. This maximum was followed by a very characteristic minimum, whose centre was in the N. E. in 1892, where there had been a maximum the preceding year, and in 1893 the center of most negative departures was over Lake Michigan. As the year of our calendar is quite conventional, one may ask whether the same facts would result from annual means whose year began, for instance, in October, or any other month.

Since it is a question of the displacement of a wave, it is necessary that the crest of this wave, or the hollow which follows it, should pass successively over the localities situated in its path.

In order to make sure that it is allowable to theorize on the tracks followed by the centers of hyperpression shown by the maps, I have taken the trouble to calculate the

consecutive means for the following stations: Eastport, Boston, Buffalo, Detroit, Grand Haven, Green Bay, Duluth and Moorhead. The curves of the following figure graphically express these means.

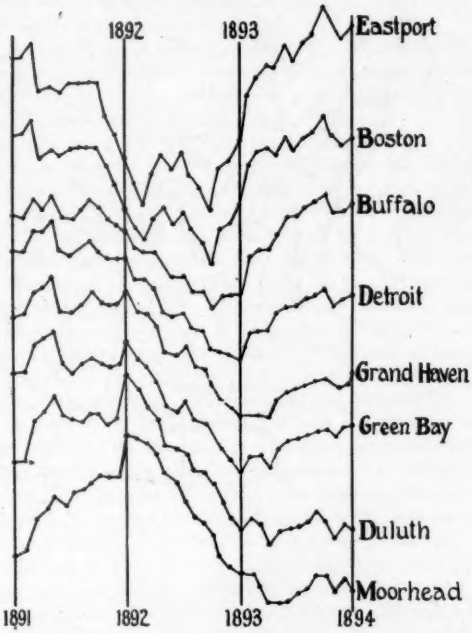

FIG. 4.

Each one of the points of these curves represents the value of an annual mean. The first, of each curve, is given by a mean barometric height for the months January to December, 1891; the second expresses the mean of the months February, 1891, to January, 1892, and so on. It is certain that the curve of Boston is not repeated in all its details.

The wave changes its form as it advances. It is quite plain, however, that the maximum which was observed at Boston as the mean of the months from March, 1891, to February, 1892, and at Detroit as that of the months May, 1891, to April, 1892, does not pass by Moorhead until the months from January to December, 1892. The curves of Buffalo, Detroit and Grand Haven show very plainly the displacement, from E. to W., of the minimum of the variation: October, 1892, to September, 1893; January to December, 1893, and March, 1893, to February, 1894.

It would be easy to give other examples not less characteristic; still, I think that the example given is sufficient to show that my maps do not lead me into error, and that I can confidently go ahead with the examination of several questions of detail. I reproduce below two of the maps I have drawn. They are those of the years 1907 and 1908.

The departures of the *Monthly Weather Review* are given in hundredths of an inch. Thus, the figure 5 on my map means 0.05 or 0.050. Such an approximation is not sufficient; the departures ought to be given in thousandths of an inch.

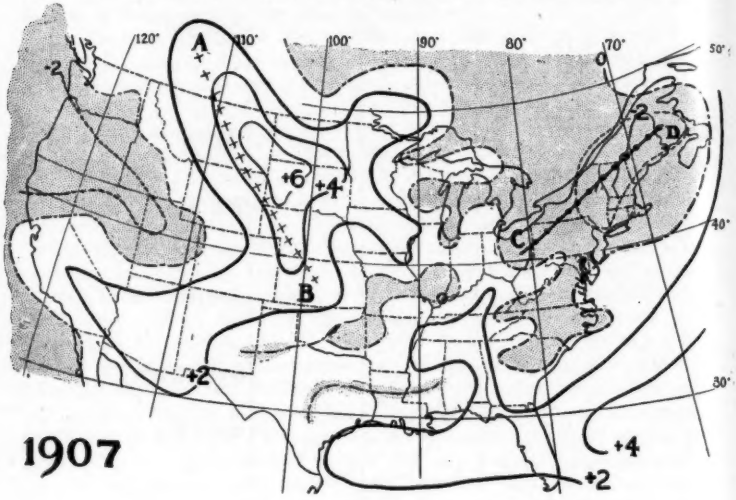

FIG. 5.

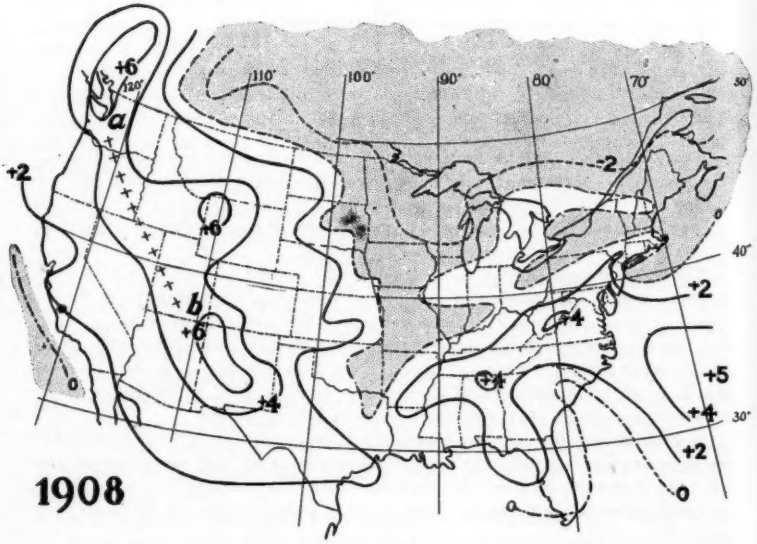

FIG. 6.

When the figures are written on the maps one remarks immediately that the departures of certain localities are doubtful. For example, the figures −4 and 0 given for Red Bluff. It is perfectly possible, however, that the number of departures which are wrong is more considerable than the maps seem to indicate, because certain details of the curves are incorrect.

The wrong departures could easily be found and corrected by using the method of consecutive means. In the same manner it would be possible to verify the accuracy of the details of the curves. When such maps shall be used for forecasting, these corrections and verifications should be made.

The maps for the years 1907 and 1908 are sufficient to show, in an absolutely indisputable manner, that the problem of forecasting the abnormal distribution of atmospheric pressure several months in advance is at present practically approachable.

To make the matter plain, I have drawn some lines which indicate the direction of the waves. The positive wave *AB*, of the map of 1907, seems to have taken the place *ab* in the following year. If this wave maintains itself longer, and if its displacement goes on westward, it will be on the coast, or on the Pacific Ocean, that the axis of highest positive departures shall be found on the map of 1909. A forecast made in this manner would be similar to the weather forecasting made daily by the different weather bureaus. However, a forecast made this way would be arbitrary and as full of uncertainties as forecastings of the weather are.

There is, indeed, another line which the preceding one crosses. It is the negative wave *CD*, on the map of 1907, and while the wave *AB* gives the impression that it moved toward the S. W., the wave *CD*, on the contrary, seems to have moved toward the N. W. or the N. There are, then, to all appearance, two distinct simultaneous movements. But if we imagine two waves, both positive, directed one from the N. W. toward the S. E. and the other from N. E. to S. W., one moving toward the S. W. and the other towards the N. W., the knot formed at the point of intersection will move exactly from E. to W. if the velocity of the displacement of both waves is the same, or following a direction between N. W. and S. W. if the velocity is not the same, or even in one of these directions in the special case that one of the waves is stationary. To well understand how the particularities of the map of 1907 were progressively transformed into those shown on the map of 1908 it would be sufficient to draw the eleven maps of consecutive means, which may be slipped between the maps we already have before us.

The map of 1909 as well, so that the means of each month could be utilized as they come. In this way it would be easy to follow the transformations which take place. Let me say again, that my maps show that the problem of forecasting the anomalies of distribution of pressure is approachable at present. It is this particular problem which is approachable, not the forecasting of the change of climate. From the point of view of this remark it is necessary to understand well what the maps of the departures represent.

They give us indications on the abnormal inflexions of the isobars,—their oscillations. The same departure observed in different places may produce a very different effect. A given departure, let us say negative, may signify a greater abundance of cold winds, or rainy winds, in a certain locality and precisely the contrary in another place.

Then, on the other hand, it is necessary to know the season of the year during which the maximum of the deviation occurs. This last point, however, necessitates a series of investigations before it can be taken into consideration. For the time being I am forced to restrict the field of my researches. I can only examine the annual means, because I am obliged, in the first place, to pass in review generalities

concerning the tendencies of variation. It is only in this way that it will be possible to get at the results without becoming bewildered.

If we look now at the special questions which present themselves we must begin by saying a few words on the velocity of propagation of barometric waves. The maps show that sometimes the anomalies of atmospheric pressure succeed each other rapidly during several years, while other groups of years are characterized by similar situations or by a very slow movement of the areas of positive or negative departures. A study of the diagrams published in the report of Sir Norman Locker forces us to admit that in other countries the same phenomenon can be observed, for there are numerous localities where, sometimes, during several consecutive years, the annual means have nearly the same value. From this point of view, the maps which I have drawn from the departures published in the *Monthly Weather Review* can serve as an example.

The positive wave directed from N.W. to S.E., across the plateau region, on the maps of 1907 and 1908, maintained itself from 1903, only undergoing slight oscillations either toward the E. or the W. Moreover, a stationary situation of this kind must be very exceptional.

From their appearance, the maps drawn can be classified as follows:

(a) Indefinite situation (1896, for example); (b) contrast between the N. and the S., —curves of equal departures directed from E. to W. (1894); (c) a center surrounded by nearly circular curves covering the entire United States (1893); (d) curves directed in such a fashion that the map gives the impression of the existence of intersecting waves. This is most often the case.

Although it is prudent not to draw too many conclusions from the stated facts, yet I wish to mention a few suggestions which follow from the examination of the maps.

In the first place, since this is a phenomenon which, in most cases, acts as if it were a wave movement, it is quite natural to compare the departures observed in the United States with those noted in Iceland, Greenland and on the Atlantic coasts of Europe.*

One wonders if the waves do not originate in the region of Iceland—if the center of the disturbances is not located there. For there is certainly a correlation between the departures noted in Iceland and those of eastern Canada and the Atlantic States. Generally the departures are of opposite character.

To illustrate this fact, I transcribe some annual departures from the general means of the twenty-five years 1876 to 1900:

	BERUFJORD.	MONTREAL.	WASHINGTON.
1876	+ 39	—29	+ 3
77	—128	0.	+14
78	+ 98	—70	—55
1881	+ 63	—16	— 8
82	— 55	+28	+26
83	—110	+43	+34
84	—118	—13	+ 3
1890	—122	+ 7	0.
91	—167	+20	+13
93	+ 43	— 9	—18
94	— 39	+13	+ 3
95	+ 91	—12	— 9
98	— 67	+30	— 5

* I have compared the curve of Stykkisholm with that of Ponta Delgada and have formed the curve expressing the differences between the mean pressures observed in these two localities. In most cases the years of exceptional high pressure in Iceland are years of exceptionally low pressure in the Azores. No kind of periodicity is apparent, and it seems that the changes in the pressure observed in the United States do not depend on the differences in question.

I have only chosen typical cases. Other years offer situations quite as interesting. For example, in 1887, 1888 and 1889 the departures observed in Iceland and in the Azores are of an opposite character, and the distribution of the different values of the departures, noted in the United States, is such that it is perfectly legitimate to admit that a considerable part of North America belongs to the waves comprising Iceland and Greenland.

The departures for 1896 and 1897 give us examples of another kind. In both years the predominance of positive departures is such that the compensations must be looked for outside of the regions taken into consideration.

Whatever it may be, the correlation, bearing the character of a seesaw, existing between Iceland and North America, is without any doubt more typical than that between the mean pressures of Cordoba and Bombay, a correlation on which W. F. S. Lockyer strongly insisted.

The initial point of the above statement was the question whether the anomalies observed in the United States take their origin in the region of Iceland, and if it is from there that they spread. It is too soon to affirm it with certainty, because the question necessitates very elaborate discussion. It seems to me that the phenomena of compensation noted are sufficiently remarkable to justify a special investigation of this kind. I intend to enter upon this study later on, when I shall be able to take into consideration the data from all the regions of the globe.

I pass now to the question of periodicity. The question presents enormous difficulties. The maps expressing the distribution of the departures force us to admit that the curves representing the succession of mean values of atmospheric pressure do not permit us to affirm or contradict the existence of certain periods of variations.

If the variations always originated from the same points of the globe, and if from there they would always propagate in the same manner and with uniform speed, the curves of the different localities would represent an immediate repercussion of given oscillations. But such is not the case, and it seems that no curve from any locality can be considered as being individual. Moreover, no departure is independent of the values observed the same year, or observed before at other places.

Therefore, the question of periodicity must be approached in an indirect way. I have examined the variations of the amplitudes of the waves noted on the detailed maps—drawn from Bigelow's figures. At first sight it seems to be the same question as that of the differences between the annual means of Stykkisholm and Ponta Delgada. It is not so, simply because it is not necessarily in Iceland and the Azores that we observe every year the largest departures. To know where the greatest departures occur, and their values, a detailed map is necessary.

The maps drawn for the United States show that the departure — 0.025 observed in St. Vincent, in 1891, is probably correct, and that the figure + 0.023 noted at Portland and Eastport is also correct. The difference of these values is 0.048. It is the maximum amplitude of the waves, inasmuch as there may be a question of annual waves.

The following figures have been obtained in the same way for the years 1891 to 1899:

48, 66, 67, 71, 66, 62, 58, 54, 49.

The amplitudes increase, in consequence, from 1891 to 1894, and decrease from 1894 to 1899. If one considers the curve expressing the frequency of sunspots, the preceding figures become so significant that I think I may affirm that we have again to deal with a new question which should be examined separately.

The amplitudes of the waves give a measure of the principal agent of the dynamical phenomena which regulate the whole system of variations.

I conclude, therefore, by saying that the examination of the annual means of atmospheric pressure observed in the different localities of the United States confirm the principal result of my researches on the variations of the annual means of temperature. That is to say, there exists a dynamical climatology, and the study of the dynamics of climates is perfectly possible.

GEOGRAPHICAL RECORD

AMERICA

MR. JOCHELSON'S FINDS ON ATTU ISLAND. The departure of Mr. Waldemar Jochelson and his wife for the Aleutian Islands, for ethnological studies, was reported in the *Bulletin* (Vol. 40, 1908, p. 753). Some details of his work on Attu Island, the most eastern of our Aleutian possessions, are printed in *Globus* (Vol. 97, 1910, p. 99) from a short report he has sent to St. Petersburg. He has made many excavations and found numerous dwelling places affording much evidence as to the development of material culture among the ancient Aleuts. His collections number 250 specimens, among which are many stone and bone carvings, 13 skulls, a complete skeleton, stone and bone lances and arrow heads, and baskets and other objects woven by women from grass. This grass weaving shows great skill and fine technic. He has also specimens of edible plants and roots, fibers, and 50 phonographic cylinders on which he took folk lore and songs of the Aleuts. He has written his descriptive text, secured a large vocabulary and prepared a grammar of the native speech. He believes that his further work on the Aleutian Islands will have much importance for primitive culture. In the seventh decade of the last century, Dr. Dall made excavations on these islands and Jochelson has been able to verify some of his observations, but he reports that Dall was mistaken in many of his conclusions. The explorer expected to spend last winter on Umnak Island and to carry his collections in April, this year, to Unalaska.

AGRICULTURE AND IRRIGATION IN BRAZIL. It is a sign of industrial health that Brazil has become interested in mixed farming and the possibilities of irrigation. Mixed farming is highly desirable in view of the depression caused by the drop in the coffee market on account of over-production. Attention is called in government reports to the possibilities in rice production, Brazil being one of the great rice consuming countries; and a fair start has been made in this industry on a scientific basis. Wheat production has also been encouraged to a notable extent and the industry is capable of great development. More recently, great activity has been displayed in the irrigation projects of the arid states of Ceara, Parahyba, and Rio Grande del Norte, the government sending a commission to the United States to study our irrigation projects and problems. The provinces in point (*Daily Consular and Trade Reports*, No. 3675, Jan. 3, 1910) have long been known for their severe drought. They lie along the coast

northwest of Cape San Roque where the direction of the prominent topographic features corresponds to the direction of the prevailing trades with the result that but little water is precipitated, in contrast to the abundantly watered coast southwest of Cape San Roque toward Rio Janeiro. A new law makes provision for the construction of dams and reservoirs, wells, river dikes, sea walls for the reclamation of low-lying and wet coastal lands, and highways and railways from the coast to the interior to furnish cheap transportation facilities and enable the sphere of cultivation to be extended much farther than at present. A scientific study is also being made of the geological, topographic, and meteorological conditions and effort is also being made to conserve forest resources and to begin reforestation. The national government assists the individual state only upon condition that at least 5 per cent. of the annual receipts of the state government are spent in ameliorating the conditions due to drought.

ISAIAH BOWMAN.

ASIA

KOSLOFF'S EXPEDITION IN CENTRAL ASIA. The first year's work of this Russian expedition resulted in some interesting finds. Entering northern Mongolia from Kiakhta, Kosloff found, near the ancient channel of the Etsin-gol, a river that rises in the Nan Shan range and flows into the Gobi Desert, the sand-covered ruins of a former city. Excavations yielded many documents, coins, household articles, etc., which were sent to St. Petersburg where experts found, on examination, that the city flourished between the 11th and 14th centuries. Later, Col. Kosloff spent three weeks on the southern shores of Koko Nor, the famous lake of northeastern Tibet, taking scientific observations and studying the hydrography of the region. Its coast line measures about 230 miles, and it is subject to sudden and violent storms. Two members of the scientific staff visited the island of Kuisu, the first Europeans who have reached it, though many pilgrims go to the island in winter, on the ice. Three monks were found there, each living in his own cave and with his own flock of sheep and goats. A temple stands there. The greatest depth of the lake, shown by the soundings, was 120 feet, near Kuisu. Col. Kosloff says the lake is slowly shrinking and the natives there report that the island of Kuisu has grown perceptibly larger in the past generation.

Detached parties explored a considerable area on both sides of Kosloff's route. A hitherto unknown corner of the Chinese province of Kansu was visited and the positions of 9 new towns were fixed. A full report of the first year of Kosloff's work appears in the *Geographical Journal* (Oct., 1909).

AUSTRALIA

THE CAPITAL OF THE AUSTRALIAN COMMONWEALTH. After some years of discussion, the location of the capital of the Australian Commonwealth has at length been selected. The site chosen for the capital town is at Canberra on the Molonglo tributary of the Murrumbidgee R., in New South Wales, about 300 miles to the southwest of Sydney. The federal district surrounding the capital is about 1,000 square miles in extent and includes the entire basins of the Cotter, Molonglo and Queanbeyan rivers. In fact, the leading consideration in the choice of land for the capital and federal district was the water supply, and it is believed that the catchment area selected will provide all the water required

for every purpose. The port of the capital will be built at the south end of Jervis Bay, about 100 miles east of the federal territory, and a route for a railroad between the port and the capital has been selected. The present population within the district is only about 4,000. The region is beautifully diversified by hill and valley and the general elevation is from 1,800 to 2,000 feet. The capital will be some 100 miles south of the railroad between Sydney and Melbourne and a branch road from the main line will pass through the federal district. Joint legislation by the Australian Parliament and the legislature of New South Wales were required for the transfer of the territory to the federal government.

POLAR

MR. LEFFINGWELL IN ALASKA. A letter to the Bulletin from Dr. C. W. Leffingwell, father of the explorer Ernest DeK. Leffingwell, reports that a communication from his son, written on Nov. 1, 1909, says that he had landed his stores safely on Flaxman Island, north coast of Alaska, and with the aid of two white men and some Eskimo had put up a small house, 16 by 24 feet, adjoining his old camp. This will furnish a comfortable shelter, being banked up with snow blocks, and will give protection to his instruments and papers. He will continue his geodetic and geological work on the north coast of Alaska for two or three years more, the expedition being at his own cost. His camp is not far from the Canada line, and possibly the overland surveyors of the line may be able to compare notes with him, next summer. He will make some very careful observations, with good instruments, to establish some point of longitude on the coast, more accurately than has heretofore been done.

THE NEW SCOTTISH ANTARCTIC EXPEDITION. Dr. W. S. Bruce was the leader of the *Scotia* Antarctic Expedition whose scientific results have taken high rank as important contributions to our knowledge of the Antarctic regions. On March 17 last, he addressed the Scottish Geographical Society on the new expedition which he hopes to lead to the Antarctic regions next year (*Scot. Geog. Mag.*, April, 1910). It is hoped that the expedition will leave Scotland about May 1, 1911, reaching Buenos Aires about June 20. It will sail thence for Cape Town, steering a zigzag course between 40° and 50° S. to supplement the bathymetrical survey of the South Atlantic begun by the *Scotia* in 1902-04. From Cape Town the party will steam direct to the Sandwich group, making soundings to try and prove the connection of the hypothetical "Rise" joining the Sandwich group and Bouvet Island, as well as the "Scotia Rise," discovered by the Scottish expedition in 1904.

The expedition will then steer from the Sandwich group for Coats Land with a view to erecting a house and landing 10 or 12 persons there. As there appeared to be no suitable landing place along the 150 miles of Coats Land discovered by the Scottish expedition in 1904, the expedition may have to go farther west or, possibly, as far east as Cape Ann, Enderby Land.

After landing the sledge party, the ship will proceed to Melbourne, steaming in as high a latitude as possible to take soundings and make deep sea research with a special view to determining former continental connections. The ship will winter at Melbourne.

In the spring, a sledge party, under Dr. Bruce, will attempt to cross the Antarctic Continent from Coats Land to Ross Sea, by way of the South Pole. At

the same time, the ship will sail southeast from Melbourne to Victoria Land (Ross Sea) and will send a party south over the ice barrier with supplies for Bruce's sledge expedition. It is likely that the two parties will meet near Beardmore Glacier, up which Shackleton pushed his way towards the South Pole, a little over a year ago.

The two parties will then rejoin the ship, proceed to Magellan Strait or the Falklands, and carry on oceanographical research in as high a latitude as the winter season will permit. In the spring, the expedition will enter Weddell Sea again to relieve the wintering party that will then have spent two years there. This party, in the absence of the ship and Bruce, will have exerted itself to survey the coastline of Antarctica both to the east and west of the station. The expedition will carry complete meteorological, magnetic, and other physical and biological outfit. The cost will be about $250,000.

Sir Ernest Shackleton's Plans. According to the London *Times* (Weekly Edition, March 4, 1910) Sir Ernest Shackleton said, just before his departure for America, that if he should decide to start, at a later date, on another expedition to the South Polar regions, the work he would undertake would probably be the exploration of the region between Cape Adare and King Wilhelm II Land. This apparently means that he would undertake to establish the coastal limits of the Antarctic Continent to the west of Cape Adare as far as Gaussberg, the mountain near which the Drygalski (German) expedition wintered. The land back of the mountain was found steadily to rise towards the interior. The Germans advance good reasons for their belief that this land is a part of the continent and to this region they attached the name of their Emperor. The region between Cape Adare and Kaiser Wilhelm II Land is the area which has long been shown on Antarctic charts as Wilkes Land, so called in honor of Lieut. Charles Wilkes, the commander of the United States expedition which, in 1840, skirted what Wilkes believed to be the border of a very extensive land to which he gave the name of the Antarctic Continent.

Temperatures, Pressures, and the Height of the Antarctic Continent. Comment on Dr. Wilh. Meinardus's paper "Die muthmassliche mittlere Höhe des antarktischen Kontinents" appeared in the *Bulletin* for February, 1910 (pp. 125-6). Professor R. DeC. Ward, of Harvard, sends us the following in which he presents the temperature results obtained both by Meinardus and Hann:

"Dr. Meinardus considers Antarctic temperatures and pressures and the probable height of the Antarctic continent as indicated by these pressures. The same writer had previously determined the mean annual, January and July temperatures between latitude 60° S. and the South Pole ('Die Lufthülle,' in A. Scobel's *Geogr. Handbuch,* 5th ed., 1909, p. 74). The results obtained by Meinardus and Hann, for the mean temperatures of the south polar area, beyond the Antarctic Circle, are as follows:

Meinardus.			Hann.			Means.		
Jan.	July	Year.	Jan.	July.	Year.	Jan.	July.	Year.
27.1°	−13.4°	1.9°	25.3°	−15.5°	3.7°	26.6°	−14.8°	3.2°

"As these mean temperatures were determined by interpolation upon the basis of few data, the close agreement is very satisfying. Dr. Meinardus's conclusions regarding the altitude of the Antarctic continent are as follows:

"1. On the basis of the seasonal interchange of air over the known portions

of the earth's surface we may assume that over the South Polar area (within the Antarctic Circle) the *actual* pressure in January is about 11 mms. higher than in July.

"2. The observations hitherto made in the higher southern latitudes give sure evidence that the sea-level pressure is higher in January than in July. The decrease in the meridianal temperature gradient, and the resulting decrease in the easterly winds at the margin of Antarctica in summer, make it probable that the pressure reduced to sea-level is lower in summer than in winter. This would be a situation similar to that which actually exists in the North Polar area.

"3. The pressure excess of 11 mms. can easily be explained if the South Polar area is elevated.

"4. A mean altitude of the South Polar area of about 1350+or—150 meters can bring about the above-mentioned pressure excess.

"5. If we assume that the land area within the Antarctic Circle embraces 14,000,000 sq. kms., the mean altitude may be fixed at about 2000+or—200 meters.

"6. The observations of altitudes around the margins of the Antarctic make it seem possible that the mean altitude of the continent is considerable.

"7. The thickness of the ice cover plays an important part in the mean altitude, as is the case in Greenland."

CARTOGRAPHY

THE MAP OF THE WORLD IN 1:1,000,000. In accordance with the action taken at the Ninth International Geographical Congress, in Geneva, the British Government sent out invitations to the various countries interested to send delegates to a meeting to be held in London, on Nov. 16 last, for the purpose of deciding upon the details essential to the preparation of a uniform map (*Bull.*, 1909, p. 765). The countries represented were Austria-Hungary, Great Britain, France, Germany, Italy, Russia, Spain and the United States. The delegates from the United States were Mr. Bailey Willis, geologist, of the U. S. Geological Survey and Mr. S. J. Kübel, chief engraver of the Survey.

The initial meridian of Greenwich was adopted. The metric system was adopted with the provision that the scale of heights and distances may also be expressed, in addition to the metric system, in terms of miles or of any other unit. Conventional symbols for representing water courses, roads, railroads, towns, cities, etc., were agreed upon, the result embodying nearly all the conventions used on the maps of the U. S. Geological Survey. The Latin alphabet alone may be used in writing names, but the spelling shall be that of the official maps of each country. The adopted spelling for China is that of the post and customs service.

The representation of topographic relief will consist, in the main, of generalized contours so drawn as not unduly to obscure other features of the map. Shading will be used to bring out features that cannot adequately be shown by contours. Color effects also will be used to show the distribution of altitudes and sea depths more vividly. Shades of blue will denote different depths of lakes and seas; three tints of green will indicate low lands from sea level to 300 meters; pale buff will then be used up to 500 meters, followed by browns growing darker up to 3,000 meters; then come violet tints fading into white at the highest elevations above 7,000 meters.

Since the ocean covers three-fourths of the earth, the atlas is not likely to comprise over 1,500 sheets, including the oceanic islands.

The sheets falling to the United States, south of Canada, including slices of the oceans, Canada and Mexico, will number 52. Mr. Bailey Willis, in an article on the International Map (*Nat. Geog. Mag.*, Vol. 21, pp. 125-32), says that the U. S. Geological Survey has now 9 of these sheets in preparation, covering parts of the eastern, central and western states. They are being drawn on a scale of 1:500,000=7.8 miles to an inch. They will be reproduced, by photolithography for publication on a scale of 10 miles to an inch and, as Congress provides the funds, will be published on the scale of the International Map—1:1,000,000. Mr. Willis says: "It is to be hoped that the task may be prosecuted with energy, and that the first edition of the one-millionth map of the United States, as a part of the standard map of the world, may be engraved and published within ten years."

EDUCATIONAL GEOGRAPHY

School Geography in the United States. The report of the Committee of the National Educational Association, made in July last, has been published in the *Journal of Geography* (Vol. VIII, pp. 1-9). The report criticised the high school course in physical geography because it places too much emphasis upon the detailed study and classification of land forms, and too little upon human response to those forms; the concrete study of human response to its environment does not receive sufficient attention; the course aims to fit the student for college rather than for the affairs of life.

Secondary school geography does not give the student a grasp on natural resources, industries and commerce; as at present constituted, it cannot give the student an adequate knowledge of regions and peoples.

The Committee then presents as the essentials of a course in geography for secondary schools, those parts of mathematical geography showing how human life is influenced by the relations between the earth and other members of the solar system; atmospheric phenomena; the ocean as a modifier of climate, as an agent in the destruction and construction of land forms, as a source of commodities, and as a commercial highway; the larger geographic forms, such as plains, mountains, rivers, lakes, glaciers, etc.; the larger resources of our country, such as soils, waterways, water powers, forests and mineral wealth; the geography of the most important countries and peoples; the shaping of history by geographic conditions; the relationships between geographic forms and geographic processes; and the responses which human life makes to its physical surroundings.

The Committee recommends that Geography be a required subject in all secondary schools to be pursued not less than one year. It should also be presented during the first year of the high school course. There should be at least five recitation periods per week and one-fourth of the total time should be devoted to laboratory and field work. Lawrence Martin.

Geography in Germany. A conception of the scope of the work in geography given at the German universities may be gained from a perusal of the titles of recent geographic theses prepared for the degree of Doctor of Philosophy. The following are in part taken from the "Jahresverzeichnis der an den deutschen Universitäten erschienenen Schriften" published by Behrend & Co., Berlin, where

further details as to exact title, author, etc., may be found. The theses may be grouped according to subject matter under the following headings:

Physiography. On the Sierra Nevada of Spain (Berlin, 1908); The Status of Armenia in the Highland of Western Asia (Berlin, 1906); The Development of the Conception of the Term "Coast" (Leipzig, 1904).

Oceanography. The California Current (Göttingen, 1909).

Meteorology and Climatology. The Hurricanes of the West Indies (Bonn, 1907); The Climate of Davos, Switzerland (Heidelberg, 1907); The Meteorologic Equator in the Pacific Ocean (Göttingen, 1906).

Cartography and Cartometry. The Mensuration of Geographic Surfaces before the Invention of the Planimeter (Göttingen, 1906); The Theory of Isocronal Lines and their Cartographic Representation (Königsberg, 1908); The Mean Altitude of Asia (Kiel, 1906); A New Calculation of the Surface of the Continental Slope (Göttingen, 1909).

Anthropogeography. The Influence of Summer Resorts on the Density of Population and the Means of Communication in the Northwestern Thüringen Wald (Jena, 1908); Town Sites of Eastern Germany (Kiel, 1907); The Upper Limit of Human Habitation in Switzerland based on the Distribution of the Chalets (Bern, Switzerland, 1906); Bodin's Theory of the Influence of Geographic Position on the Political Life of Nations (Bonn, 1904); The Density of Population in the Northwestern Lowland of India (Göttingen, 1909).

Commercial Geography. Commercial Geography of Saxony (Jena, 1908); The Importance of Beasts of Burden in Africa (Jena, 1908); On the Railroads of the French Colonies (Jena, 1908); The Commercial Utilization of the Topography and Position of Ireland (Rostock, 1908); The Development of the Lines of Communication in Australia (Leipzig. 1906); The Passes of the Western Carpathians (Leipzig, 1906); Paths and Trails geographically considered (Leipzig, 1906); Commercial Geography of South Africa (Jena, 1905); Canada and the Hudson Bay Co.

Discovery and Exploration. The Discovery and Explorations of the Australian Coast and the Islands of the Pacific Ocean by the French from 1783 to 1830 (Bonn, 1907); History of the Discovery and Exploration of Greenland up to 1800 (Erlangen, 1906); Exploration of the Mainland of Indo-China by the Jesuits at the beginning and close of the Seventeenth Century (Würzburg, 1905); The History of Discovery and the Cartography of Africa up to 1749 (Munich, 1905).

Regional Geography. The North Brazilian Coastal State Ceará (Bonn, 1908); The History, Nature and Importance of the Island of Sachalin (Bonn, 1907).

Development of Geography and its Methods, and Biography. Geographic Courses at the former University of Altdorf (1623–1809) (Erlangen, 1908); Julius Fröbel's Investigations of the Methods and System of Geography and of their Place in the Development of Geography as a Science (Halle, 1908); Karl Ernst von Brun as geographer (Munich, 1908); Malte-Brun, France's Foremost Geographer in the first quarter of the Nineteenth Century (Leipzig, 1908); James Rennell, the Creator of Modern Geography in England (Leipzig, 1904); The Teleologic Bent of Karl Ritter's Mind (Leipzig, 1905); Alfred the Great as Geographer (Munich, 1904).

W. JOERG.

SUMMER FIELD WORK IN PHYSIOGRAPHY. Professor W. M. Davis will lead a party of students this summer, in physiographic field work in Colorado. The work will be open to students (men only) who already have some knowledge of physiography. It will begin at Denver, on July 6, six days a week, for two or three weeks, and will be extended by individual field work to five or ten weeks by those who wish to count the course towards a Harvard degree. The object of the course is to study parts of several ranges of the Rocky Mountains in Colorado, with particular attention to the best methods of describing the forms observed. Those who wish to attend this course should address Prof. W. M. Davis, 17 Francis Ave., Cambridge, Mass., stating the work they have already done in physiography.

GEOGRAPHICAL LITERATURE AND MAPS

(INCLUDING ACCESSIONS TO THE LIBRARY)

BOOK REVIEWS AND NOTICES

Dictionary of American-Indian Place and Proper Names in New England; with many Interpretations, etc. By R. A. Douglas-Lithgow. xxi and 400 pp., Portrait, and Bibliography. The Salem Press Co., Salem, Mass., 1909. $7.

The laudable purpose of Dr. Douglas-Lithgow was to give all the Indian place names in New England, that have not been lost beyond recovery, to assign them their proper locations and, as far as possible, to translate them into English. The names are alphabetically arranged under each of the States; also, to present a list of American Indian proper names occurring in the history of New England with references to the literature in which the names occur and such facts as may be briefly given about the persons who bore them. The book concludes with lists of the principal Indian tribes of New England, specimen vocabularies, etc. A great deal of information, such as this book contains, has been irretrievably lost, and the great labor that Dr. Douglas-Lithgow has given to ensure the preservation of what remains, deserves the fullest appreciation.

De Reis van Jan Cornelisz May naar de Ijszee en de Amerikaansche Kust. 1611-1612. Verzameling van Bescheiden uitgegeven door Mr. S. Muller Fz. lvi and 226 pp., 2 Maps, Bibliography, and 2 Indexes. Martinus Nijhoff, The Hague, 1909.

Not much is seen in books of this navigator of the early part of the Seventeenth Century. He was skipper of the vessel De Vos which, with the De Craen, made a voyage across the Atlantic in 1611. In the following year the De Vos repeated the journey from west to east and it was one of the remarkable voyages of the early days. Starting from Cape Cod, she made for the north of Norway, then sailed to Novaya Zemlya and pushed boldly north through Barents Sea till she was stopped by ice above the 77th parallel. Thus May had a good opportunity to observe conditions in the European ice ocean and also along the American coast from Newfoundland to Nova Scotia and southward to Cape Cod. He recorded his observations and impressions in a voluminous journal from which Mr. Muller has derived most of this book though he has also drawn upon other sources of information. The work is a valuable addition to the literature of the early navigators.

Henry Hudson in Holland. An Inquiry into the Origin and Objects of the Voyage which led to the Discovery of the Hudson River. With Bibliographical Notes. By Hen. C. Murphy. Reprinted with Notes, etc., by Wouter Nijhoff. xii and 150 pp. Martinus Nijhoff, The Hague, 1909.

A reprint of the book published in 1859 by Henry Cruse Murphy, who was then our Minister at The Hague. Mr. Murphy made an investigation to ascertain,

more precisely than had been explained up to that time, what originated the voyage that Hudson made in behalf of the Dutch East India Co. and which resulted in his exploration of the larger part of the Atlantic coast of the United States and his discovery of New York Bay and its noble tributary. Mr. Murphy prepared a clear account of the initiation and details of the expedition and published important documents that were then first brought to light. The edition he printed was small and the work is now very scarce.

In the reprint, Mr. Nijhoff gives the documents both in the original and in English while Mr. Murphy printed only a translation. Other documents are also inserted and the editor has supplied many notes and an adequate bibliography. The work well deserved reprinting and the additions made to it enhance its value.

De Zuidwest Nieuw-Guinea-Expeditie 1904/5 van het Kon. Ned. Aardrijkskundig Genootschap. xxvi and 676 pp., 9 Maps, Illustrations, Plates, and Diagrams. E. J. Brill, Leyden, 1908.

A detailed account of the adventures and discoveries of this expedition which was sent out by the Royal Dutch Geographical Society to explore the south-west coast of Dutch New Guinea and, if possible, to reach the lofty range of mountains extending eastward from the peninsula south of Geelvink Bay. Two steamers, the *Flamingo* and *Anna,* were loaned to the expedition and the colonial government gave all assistance in its power. Mr. R. Posthumus Meyjes, the leader of the expedition, made a preliminary cruise along the coast to be explored and in September, 1904, the party set out from Surabaya, Java, on their two vessels. On reaching the south-west coast, the effort was first made to find good anchorage ground near the mouth of some river that might afford a navigable way for small boats and thus facilitate a journey towards or to the great Sneeuwgebergte (Snow Mts.) first seen by Carstens in 1623. Attention was first given to Flamingo or East Bay and the North river which empties into it which was later ascended to within sight of the highest peak of the Snow Mountains whose height was fixed at 16,700 feet. Its position was determined as 4° 3′ 30″ S., 137° 8′ E., and its top is snow-crowned.

The first penetration of the interior, however, was made from Etna Bay, south of the Geelvink Peninsula and a party under Captain de Rochemont advanced towards the Charles Louis Mountains, the western end of the great interior range. Owing to difficulties with the coolies this expedition was not entirely successful though the unknown Omba river and its tributary, the Aru, were ascended for 30 miles and an elevation of 6,600 feet was attained at the last camp.

The work included the rectification of the mapping of the entire southern coast line. The astronomical observations were connected with those of Australia through Thursday Island. Pisang Bay was found to be a delusion and was wiped off the map. The Digóel river, discovered in 1903, was ascended for 300 miles from the sea. The work in the interior was in entirely new country. Nearly the whole of this large volume is a pioneer contribution to our knowledge of the lands, hydrography and peoples of the southern part of Dutch New Guinea. The book is profusely illustrated with photo-engravings and maps, many of the illustrations showing the inhabitants and their rude arts. The whole work reflects credit not only upon the explorers, but also upon the Royal Dutch Geographical Society.

Mannus. Zeitschrift für Vorgeschichte. Organ der Deutschen Gesellschaft für Vorgeschichte. Herausgegeben von Professor Dr. Gustaf Kossina. Vol. 1, Nos. 1/2 and 3/4, pp. 327. Curt Kabitzsch (A. Stuber's Verlag), Würzburg, 1909. 16 Marks a year.

In January last year, the Deutsche Gesellschaft für Vorgeschichte was organized, in Berlin, with 200 members and under the presidency of Prof. Dr. Gustaf Kossina, of the University of Berlin. Before the end of the year, the Society issued the first numbers of *Mannus* which will contain its literary contributions to prehistoric research. This new journal bids fair to place Germany on even terms with France, Belgium, England and Switzerland in its literary output relating to prehistoric times. In the excellence of its contents and its superior mechanical production, *Mannus* compares favorably with the foremost publications on this subject. The number of parts issued each year will not be definitely fixed, but will be at least three or four. Dr. Kossina, the editor, in the first (double) number, begins a series of articles on "Der Ursprung der Urfinnen und der Urindogermanen und ihre Ausbreitung nach dem Osten." Among the other titles of extended papers are "Das Sonnenrad und das christliche Kreuz," "Urzeitliche Astronomie in Westeuropa," "Übersicht über die Forschungsergebnisse in Nordböhmen," etc. The papers are beautifully and copiously illustrated with photo-engravings, wood cuts, diagrams and maps, some of them in colors. The departments include communications and discussions, reports from societies and museums in Germany and other countries, and book reviews. Single numbers will not be sold, but *Mannus* may be obtained by annual subscription.

Handbuch der Klimatologie. Von Dr. Julius Hann, II Band., Klimatographie. I Teil: Klima der Tropenzone. 3te, wesentlich umgearbeitete und vermehrte Auflage. Pp. 426. Stuttgart, Engelhorn, 1910. 14 marks.

Teachers of climatology the world over, meteorologists, medical men—in fact, all men of science who at one time or another need climatological data, will welcome the appearance of the second volume of the third edition of Hann's splendid "Handbuch der Klimatologie." The first volume, dealing with the general aspects of the subject, was recently noticed in the *Bulletin* (Vol. XLI, No. 3, March, 1909, pp. 181-183). The volume now before us deals with the climates of the tropical zone. The author has very wisely maintained the familiar classification of the zones by latitude circles for the purposes of this discussion, instead of attempting to divide his data in accordance with any newer scheme. By adhering to the most widely-known and most practical classification he has made his volume of far more general service. He recognizes, of course, the value and the greater scientific accuracy, from the standpoint of climatology, of the division by isotherms. The amount of labor necessary in the preparation of this book is so stupendous that one can only marvel at it,—and be devoutly thankful that Hann has had the health and strength to accomplish it. For he has laid the whole scientific world under a debt of gratitude to himself. The tediousness of reducing the temperatures of station after station to true means can only be appreciated by those who have carried out such a task, and yet the author modestly says, of this stupendous labor, "die erforderliche Arbeitsleistung war keine geringe . . . . Die Temperaturmittel sind nach Möglichkeit auf wahre Mittel reduziert worden . . . . Die Jahresmittel . . . halte ich für recht sicher."

Those who have kept up with Hann's recent work will remember that he has lately paid special attention to the whole question of the determination of true means from the temperature observations available for tropical stations. It is for the reason that one is so serenely sure of all of Hann's work that the "Handbuch der Klimatologie" is so indispensable.

Every one knows that this book is the source of information on the climates of the globe. Dry tabulation of uninteresting data is not the distinguishing characteristic of this volume; far from it. Tables of such data there are, in goodly number, and surely there must be; but so carefully selected are these data, so admirably summarized, and so skilfully interspersed with well-chosen, thoroughly live descriptions of the different climates, that the study of the book, and even the reading of it, is neither tedious nor difficult. The author clearly recognizes the importance of descriptions of the weather types which make up climate, and of the controls of climate over crops, and over human life in all of its varied activities, and he has certainly made a careful and an admirable selection of such descriptive accounts.

The second volume of the second edition numbered 384 pages; the second volume of the third edition covers 426 pages. We note also that the present volume has its own index. In the second edition, the index to all three volumes was at the end of the third volume, which was a considerable inconvenience. The introductory chapter, on the characteristics of the tropical zone as a whole, has been extended, and improved. In fact, throughout the volume, there is everywhere evidence of careful, systematic and up-to-date revision, the literature up to the middle of 1909 receiving consideration. The increased size of the page in the new edition lends itself more readily to a clear presentation of the tabular matter than was the case in the second edition. Numerous bibliographic notes enable those who seek fuller information to follow up the subject at every turn. In fact, the whole volume is one which it is an immense satisfaction to the reviewer to bring to the attention of his scientific colleagues. It is a book which belongs to that very small class which may be labelled "perfect."

R. DEC. WARD.

La Côte d'Azur Russe. (Riviera du Caucase). Voyage en Russie méridionale, au Caucase occidentale et en Transcaucasie. Par E.-A. Martel. 354 pp., 388 Illustrations, 34 Plans and Map. Librairie Ch. Delagrave, Paris, 1908. Fr. 10.

In 1902, Mr. Martel was invited by the Russian Government to undertake a journey of exploration in the western Caucasus with the end in view of thorough development of this Russian littoral of the Black Sea. The genial climate of the western slope of Caucasus, well protected from the cold winds, combined with wonderful scenic beauty, led to the establishment of a tourist and health resort in this Caucasian Riviera between Novorossyisk and Soukhoum-Kalé. This coast is admirably adapted for sea bathing; and magnificent forests in the background afford ideal spots for sanatoriums. The Russian Government is very desirous to bring this Riviera up to date in all respects. New towns are being established, and the work of colonization is pushed on rapidly.

This volume, the result of Mr. Martel's explorations, gives a detailed account of conditions at the present time.

Natural conditions for a brilliant future are there and in plenty, but may not

be fully realized, according to the writer, until two essential difficulties in the way of development are obviated. These are poor communications and the existence of endemic fever. A railroad line must be built from Novorossyisk to Poti, the present mode of communication by steamer between these two ports, a distance of 450 kilometers, being entirely inadequate.

As regards malaria, Mr. Martel found that, the climatic, topographical ond hydrographic differences between the Pontian malarian districts in western Europe and the Caucasian littoral are entirely in favor of the latter. The fever here has less tenacity and wherever hygienic measures have been introduced and a drainage system established, has entirely disappeared.

The necessity of hydrological investigations was particularly emphasized, and much attention has therefore been given by Mr. Martel to the question of water supply, the exploration of subterranean streams, caverns, and grottoes. As a speleologist, the author would have liked to spend more time than he did in cave exploration. Nevertheless such explorations of caverns as he was able to make, helped to confirm the conclusions he had reached in earlier speleological researches in other countries and to prove the law of absorption of rain by abysses, the storing of waters by caverns, the reappearance of the same waters again, the burying of subterranean canals, the desiccation of caverns and the general descent of subterranean waters into the depths of the earth's crust. The accidental relation of grottoes to metalliferous veins has been proved to be more frequent than their direct relation to the thermo-mineral springs which offer few examples up to the present time. However, the renowned mineral springs of Matsesta, have a direct relation to two neighboring caverns. Many caverns are hard to explore on account of a great abundance of sulphurous gases. At the apertures of the caverns, where thermal springs are found, a great number of votive offerings may be seen. Thus, the universal cult of the therapeutic waters is found here as everywhere else.

Geologically the soil is prodigiously varied. The similarity of the subterranean hydrology to that of the Karst, Causse, etc., is obvious and confirms the synthesis established by the author of the régime of subterranean waters in fissured calcareous soil.

A chapter is given to the climate of the littoral. The mean temperature in western Caucasus is 14.2° C. and the first flowers appear in January. The large precipitation is due, in part, to the peculiar shape of the Black Sea where the north and west winds, laden with moisture, buttress the high mountains of Caucasus and Lazistan. The author asserts, what is now usually denied, that the immense forests greatly influence rainfall. Though the humidity is excessive, Mr. Martel is far from advising the cutting of forests. He firmly believes in their beneficial influence on climate. But he strongly advocates clearing away the underbrush in order to eliminate the excess of moisture.

Western Caucasus has the distinction of being the only country, except Bielovieza in Lithuania, where the European bison still lives. There are about 600 head on the preserves of one of the Grand Dukes and it is also found in the mountain forests.

Much remains to be studied and revealed on this Black Sea littoral. Good roads, drainage, the regulation of drinking water and many other improvements are needed, but, when this is accomplished, the Russian Riviera may well rival, as a tourist resort, the French and Italian Rivieras, particularly as the scenic

beauty of the Caucasian littoral surpasses that of the Mediterranean pleasure resorts. The inhabitants of this region are inclined to be indolent and lack initiative. On the other hand, they have extraordinary endurance. Tea plantations flourish and a considerable amount of wine is produced. The table mineral waters are highly effervescent. The well known Narzan and other brands are much appreciated throughout the Russian Empire and are now an important item of export. Mr. Martel was surprised to find that in a large hôtel-pension at Sotchi, one of the fashionable stations, only mineral water, tea and coffee could be obtained. He compares these Russian hotels to the temperance houses in Ireland.

Geographically, the value of this book is increased by the fact that the author carefully read and studied all the books and articles written on this region, enumerates and cites them frequently, pointing out diversity of opinion, errors in estimated altitudes, etc. The descriptive part of the volume is very entertaining, written in a vivacious and easy style, with touches of humor truly Gallic.

H. DE HUTOROWICZ.

Sicily, the Garden of the Mediterranean. The History, People, Institutions, and Geography of the Island. By Will S. Monroe. xx and 405 pp., numerous Illustrations, and Index. L. C. Page & Co., Boston, 1909. $3.

A good book written with a sincere purpose to make it useful to the tourist and interesting and instructive to the general reader. The human side of the subject is emphasized and the larger part of the book is given to the manners, customs, habits and institutions of the Sicilians. The topics, in order of treatment are the geography of Sicily, its history, the ethnic, moral and social conditions of the people, hostelries, brigandage, the Mafia, religion, education, industries, commerce and the creative arts. The final chapters are on Mount Etna, the leading cities and their chief monuments, the Messina earthquake, suggestions for tourists and a select bibliography.

Through Uganda to Mount Elgon. By J. B. Purvis. 371 pp., 42 Illustrations, Map and Index. American Tract Society, New York, 1909. $1.50.

This excellent book was written by a missionary who has long lived and labored in British Central Africa. He records here the results of years of observation and experience and his book, though an entertaining narrative, is not superficial. A third of it is given to his latest journey, this time by rail, from the Indian Ocean to Victoria Nyanza, the present condition of the tribes along the way, the effect upon them of the white domination, and the dread scourge of sleeping sickness.

Another third is devoted to Uganda in its past and present aspects; and the author vividly depicts the rapid strides that have been made in bridging the gulf between primitive barbarism and western civilization. He deplores, however, the present stagnation in the religious life of the people who are thirsting, instead, for general education and material good. The government is doing nothing towards the industrial education of the natives and such progress as has been made in this direction is due to missionary effort. Progress is now embarrassed by shortness of the labor supply and the regular increase of wages.

The last third relates to the almost unknown region east of the Nile to Mount

Elgon among the Bagishu, a cannibal tribe. This section is, in the main, a new contribution to our knowledge of Africa. The book will have a worthy place in the literature of the east central part of the continent.

Sunset Play Grounds. Fishing Days and Others in California and Canada. By F. G. Aflalo. xii and 251 pp., many Photo-Engravings, and Index. Witherby & Co., London, 1909. 7s 6d.

The author is a British authority on sport, a devotee of fishing, a lover of scenery, and an insatiable vacation traveller. His books are many; and the present volume will be especially helpful to anglers for he is a master of the fishing art, has had large experience in strange and distant waters, discusses local conditions, and sums up the expense. He went to California, by a circuitous route, especially to catch tuna at Catalina Island off the coast. This enormous game did not materialize, but Catalina is a paradise for sea fishing and the author had fine sport with sea bass, yellowtail, and albacore. He also tried his skill in Lake Tahoe and a number of Canadian lakes. Much of his book is given to the places he visited from Barbados and Panama to the Yosemite Valley, the Canadian Rockies and prairies, Niagara and the St. Lawrence. He bubbles over with humor and there are one or two smiles to every page. In Seattle, he says, the Carnegie library contains 100,000 volumes, "including works by myself, Shakespeare, and Mr. Bernard Shaw." In his many comments on our country and people, he stretches the truth a little for purposes of fun or sarcasm; but what he says about fishing may be absolutely relied upon.

Die Entwicklung der Kontinente und ihrer Lebewelt. Ein Beitrag zur vergleichenden Erdeschichte. Von Dr. Theodor Arldt, Oberlehrer an der Realschule in Radeberg. Mit 17 Figuren und 23 Karten. Leipzig, Wilhelm Engelmann, 1907.

Palæogeography is a very young science, and can hardly be said to date back farther, in fact, than Neumayr's treatise, of 1885, on the Jurassic formations. So far it has received rather one-sided treatment because it was based exclusively on marine life regardless of the testimony of the lands. It is this vacancy which the author wants to fill by his comparative history of the earth, and more especially of the continents. As the book is a first attempt in this line, some space is devoted also to an explanation of the methods of palæogeography, with an examination of their specific values. Each one, if used exclusively, can lead to but imperfect results. Comparisons of the geological formations are naturally limited to what erosion has left over for us, but cannot ascertain their original extent; that of palæontology is insufficient through the incompleteness of the fossil remains; plant and animal geography only allow us to guess the approximate distribution of land and water in former ages, but never to define old coast lines or even the outlines of continental shelves. It is only by a combination of the four sources of records that anything like accuracy can be obtained, and therefore the author refuses to accept as a fact any deduction that is not based on at least several, if not all, of the classes of testimony named.

After this explanation of his method, the author offers in the two main parts of the book, first, a geological history of the organisms by realms and classes, and of the old continents and oceans, followed by discussions of the laws and processes which determined their evolution; secondly, a geological history of

the earth by periods, with a comparative review of the continents, plants, and animals, of each. An adequate review of the book would require the combined efforts of a geologist, biologist, palæontologist, physicist, astronomer, chemist, and others. The geographer-geologist ought to be recommended especially to the study of the "cycles" in earth history which the author wishes to establish. He finds that there is a regular repetition, in the history of the land, of marine transgression, mountain upheaval, vulcanism, and glaciation, *viz:* (1) A cenozoic-mesozoic cycle: Diluvial ice age—eruptions of basalts, trachytes, phonolites—formation of the Alpine system—mesozoic transgression. (2) Young-palæozoic cycle: Permian ice age—eruptions of porphyries, etc.—formation of the Hercynian system—Devonian transgression. (3) Middle palæozoic cycle: Devonian ice age—eruption of diabases—formation of the Caledonian system—upper Silurian transgression. (4) Old Palæozoic cycle: Silurian ice age—eruption of diabases—formation of the Brazilian system—Cambrian transgression. (5) Algonkian cycle: Precambrian ice age—eruption of diabases—formation of Hebrides system—lower Algonkian transgression, etc.

These cycles seem to be proven from the Middle Devonian up, and probably for the earlier periods. Thus, the author asserts, our present knowledge of earth history is perfectly sufficient to establish rational and continuous processes of development in obedience to general laws. In spite of great changes in the arrangement of the continents on the globe there are nowhere indications of great catastrophes, only of continuous progress, not always in a straight line, indeed, but always with a positive net result in the end. One may well say, in the author's own words, that, no matter whether his theories are right or wrong, they are at least possible, and it will certainly require not a little work to improve on them.

A bibliography of 304 numbers, complete indices of authors, animals and plants, places and subjects, and 23 maps, make the book a treasury of palæogeographic references even for those who are not particularly interested in the subject as a whole. One familiar with the problems of the profession cannot help wondering how a comparatively young German high school teacher ever found the time to write it. MARTHA KRUG GENTHE.

Ein unerschlossenes Kulturland. Neuquen und Rio Negro, Argentina. Von W. Vallentin. vi and 229 pp., and 74 Illustrations. Hermann Paetel, Berlin, 1907. M. 3.

Vallentin's book is political rather than geographical. He desires to promote the formation of German colonies among the eastern, Argentine valleys of the Andes, between the 36th and 42nd parallels, that German ideals, language and customs may be preserved out of the Fatherland as well as in it, and that another market may be made for German wares.

Dr. Vallentin rode through the southern half of the region referred to, a few years since, and devotes two-thirds of his book to a charming, readable account of this journey. His style is easy and very vivid, calling before the reader's mind the dreary eastern pampas that must be traversed before the foothills are reached, where "splendid dark foliage rises from the carpet of lighter colored grass. Out of the blue-black ravines peeps the moist green of shrub and bush, and between grey, moss-grown ledges flash the clear waters of the mountain torrent. Everywhere, in clefts and hollows, on slopes and in valleys a luxuriant

plant-world; grass, bush and tree, and far away the sober mountain giants with bluish shimmering ice-caps on their white heads, the soft snow mantle around their shoulders: truly an imposing view."

The personal element, descriptions of the rare inhabitants, the means of travel, the plants and animals are the strong features of the book. Its contribution is not new subject matter to geography. Moreno drew the picture twenty-five years ago, but this appeal to another audience is an attractive one.

The author's patriotism is intense. He sees a bit of heaven in every German farm. Not that he is blind. He bemoans his countrymen's lack of co-operation, but German faith, German industry, German cleanliness, German hospitality are words he loves to conjure with. That his aspiration for a solid German-speaking population in a foreign land should arouse fears of a "German Peril" seems to him puerile and due to the machinations of "our dear cousins across the Channel" and the North Americans. "No one in Germany has any thought of such folly. Such settlements are of course for private enterprise, the Government has nothing to do with them, at least it must never put itself to the front."

Chile still supplies the scanty population of the agricultural strip and dominates its commerce, thus repeating the history of the western provinces further north, all of them first settled from across the Andes and still closely bound to the Pacific coast by the exportation of Argentine cattle. The railroad that was just touching the eastern border of Neuquen was beginning to promise a closer intimacy with the national capital, but the rail-head was still 250 miles from Lake Nahuel Huapi, the central point in the fertile belt which is in good communication with Chile by the Perez Rosales pass. This is little more than 3,000 feet above the sea and small steamers ply on the lakes at both sides.

As yet agriculture is limited to supplying the very limited local consumption, the population is less than one to a square mile, and grazing is the only profitable business; but with the coming of the railroad this will change, for the possibilities are great. The best lands have been taken up already by Chilean, English and North American speculators and prices are rising (as high as $4 an acre, for purely grazing lands), but a company with capital could still obtain ground at reasonable rates. The author—a captain with the Boers—fears that the English will seize all the chances and build a railroad, too.

Voss's map gives this belt less than twenty inches rain, though the higher slopes doubtless receive more and irrigation should be nowhere difficult. Within the mountain border nearly every valley has agricultural lands. The east is almost a hopeless desert which includes most of Rio Negro and perhaps half of Neuquen. There remains an area rather smaller than Switzerland, with a warmer climate but much less rain.

The illustrations are not very good and a number of them are much retouched.

MARK JEFFERSON.

Corrasion by Gravity Streams with Applications of the Ice Flood Hypothesis. By E. C. Andrews. Department of Mines, Sydney, N. S. Wales. Reprinted from *Journal and Proc.* of the Royal Soc. of N. S. Wales, Vol. 43, 1909, pp. 204-330, 11 figs., 3 appendices, and a bibliography.

An important paper with new conclusions relating to certain valley forms due to glaciation. The first part is devoted to theoretic considerations of stream bow and channel scour, the second to applications of principles to ice streams

and their associated valley forms, and the third to the application of hypotheses of origin to specific areas. The most important point in the paper relates to a modification of Johnson's hypothesis for the bergschrund origin of cirques. Without invalidating Johnson's conclusions with respect to basal sapping of the cirque wall, the author yet considers that the different erosive values of present and past glaciers have not been taken sufficiently into account. He regards the present bergschrund as an effect rather than a cause of modern cirques (p. 286); and as the result of tension in a crystalline solid which, during the glacial period, was continuous owing to greater velocity. It is also concluded that under the conditions during vigorous ice-cutting it is improbable, on theoretic grounds, that the bergschrund could have penetrated to bed-rock at the foot of the cirque wall. He finds that the smaller and newer cirques of waning ice streams are steeper than the older enveloping forms, and have far more favorable opportunities for basal sapping due to temperature fluctuations above and below the freezing point as controlled by the bergschrund.

The analysis merits consideration by American physiographers for it calls attention to the necessity for considering the glaciers once occupying certain mountain valleys as waxing and waning glaciers which produced quite different erosional effects during different periods of their cycle of development. The application of the principles of stream flow to the valley forms of glaciated regions is exceptionally effective and would seem to throw new light not only upon cirques and channel steps but also upon hanging valleys. The best development of hanging valleys is found to be in those regions where the landscape was prepared by pre-glacial erosion for great local variations in glacier velocity and hence in valley deepening. ISAIAH BOWMAN.

Fighting the Slave-Hunters in Central Africa. A Record of Twenty Six Years of Travel and Adventure Round the Great Lakes and of the Overthrow of Tippu-Tib, Rumaliza and Other Great Slave Traders. By Alfred J. Swann. Introduction by Sir H. H. Johnston. xvi and 359 pp., 45 photo-engravings, Map, and Index. J. B. Lippincott Company, Philadelphia, 1910. $3.50.

All who know the work that Mr. Swann did in British East Africa and the Nyasa Protectorate during more than a quarter of a century (1882-1909) will be glad that he has written this book. He began his busy life there before the activities of the whites had made any change in the aspect of country and peoples. During a large part of his African career he was high in the service of the British Government. No man knows that part of Africa better than Mr. Swann; and his book contains the gist of what he learned and of his many adventures during long years of labor and anxiety. He had much to do with the Arab and native slave traders and for twenty-six years he was prominent in the efforts to crush their accursed traffic; and he tells the story of a large part of eastern tropical Africa from the days when caravans brought thousands of slaves to the east coast and left thousands dead upon the road, to these modern times when great numbers of natives are learning trades and hundreds of thousands have seen mighty changes in their condition and outlook.

This book, written out of uncommon fullness of experience, is one of the most informing works on any part of Africa that has appeared in a long time. A good feature is the detailed description written under each of the illustrations.

In the Grip of the Nyika. Further Adventures in British East Africa. By Lieut.-Col. J. H. Patterson. xiv and 389 pp., engravings from half tones, Maps, and Appendix. The Macmillan Company, New York, 1909. $2.00.

This book, by the author of "The Man-Eaters of Tsavo," can scarcely fail to have as many readers as the earlier work. In the opening chapter he records a few hitherto unreported appearances of man-eating lions, but nearly all the book is given to the unadorned recital of his adventures, many of which were really exciting, among the wild men and wild beasts of the part of British East Africa where he has made his recent expeditions.

His latest journey was for the purpose of delimiting for the government of British East Africa a part of the boundary of the great northern game reserve which extends from about fifty miles north of the equator to within the same distance of Abyssinia. On this expedition he penetrated into little known regions and his sketch maps of the Guaso Nyiro are good material for the improvement of our mapping of this part of Africa. The incidents of this journey are of unique interest and the author's description of the country and its human and animal life will well repay any reader. There is probably nothing finer in recent writings on Africa than the pages which Col. Patterson gives to the night he spent in hiding at a solitary water hole and his record of what he saw when he was alone with many varieties of animals from giraffes to lions (pp. 259-263).

Marcus Whitman, Pathfinder and Patriot. By the Rev. Myron Eells, D.D. 349 pp., Illustrations, and Index. The Alice Harriman Company, Seattle, 1909.

Perhaps the time has come when the work and experiences of our pioneers and pathfinders will be more highly treasured than ever. This book is of such a character. No one was better qualified to write the book than the late Rev. Dr. Eells. Fortunately, he completed his manuscript before his death and a number of citizens of our northwest coast have rendered the patriotic service of supplying the funds needed to publish it.

The story of Marcus Whitman, missionary, is really a history of a part of the early days on our northwestern coast. Many have given to Whitman the credit of being the primal influence in keeping Washington and Oregon for the United States at a time when this vast domain seemed destined to fall into the hands of England. However this may be, Dr. Whitman was one of the strongest personalities in the northwest; and this book tells just what he and his young wife found when they cast their lot in that great wilderness, and how the unfolding of events there was a part of their own life story, till the tragic day in 1847, when both were massacred, with many other whites, by the Indians. This book will have its own place in the history of that part of our country.

Manual of Physical Geography. By Frederick Valentine Emerson, Ph.D. xvii and 291 pp., 58 Figs. and Index. The Macmillan Company, New York, 1909. $1.40.

Dr. Emerson's book includes two hundred and one exercises tested by the author in classroom practice. Of this total one hundred and seventeen are starred as particularly good. Eight exercises are devoted to The Earth as a

Planet; eight to Temperature; eight to Moisture; ten to Cyclones and Anticyclones; twelve to Miscellaneous Climatic Phenomena; three to Common Minerals and Rocks; one to The Contour Map; thirty-one to Weathering, Streams and Stream Valleys; thirty-three to Land Forms, due to structure; fifteen to Glaciation; twelve to Lakes; eleven to The Ocean; eleven to Shore Lines and Forms; twelve to Harbors; nine to Soils; and seventeen to Typical Areas.

As this outline of the contents indicates, the volume follows largely the plan of procedure in teaching physical geography in our high schools and colleges for the last fifteen years, but from which many of our colleges and normal schools and some of our high schools are breaking away. The exercises call largely for a formal and mechanical study of maps, deadening to pupils except where the teacher is a master.

Considering the emphasis that has been given increasingly to the human side of physical geography in the last five years, it is more than disappointing to find so little attention given in the outlines, to the human and life responses found in various physical areas. This disappointment is increased when one realizes that the author, by his other writings and in practice, has shown that the life side is most interesting and vital to him. Yet rarely is a suggestion of the life conditions mentioned under the land forms, and this phase is more emphasized under the topics dealing with the ocean than those dealing with the land areas.

We have had many manuals of physical geography, of which this is the most inclusive but not the most severe that has thus far appeared. The country is waiting with more than eagerness for a guide that will show how to develop strong laboratory work in reference to the broad geographic study of areas and types of land forms. Such a volume will blaze a new path in a thicket which many are trying to enter; the volume under consideration is the latest guide for a broad road that has developed from a trail in the last fifteen years. It is a suggestive book for those who would teach de-humanized physical geography (as the author could not do), but such work is rapidly yielding to humanized physical geography, even for those who are training to be specialists in the field.

R. E. Dodge.

Geographical Essays. By William Morris Davis. Edited by Douglas Wilson Johnson. vi and 777 pp., 130 Figures and Index. Ginn & Company, Boston, 1909. $2.75.

The republication in a convenient and welcome form of the chief essays on geography and geography teaching from Professor William Morris Davis, renders available for workers in the field many important papers that have hitherto been relatively inaccessible. Whether the interested worker is a specialist in the study of the genetic development of land forms or a worker in attempting to make the results of experts available in education, he must constantly refer to the work of Professor Davis and this volume will therefore be a treasury of valuable geographical materials to him.

The volume contains twenty-six essays of which twelve are entitled Educational Essays, and the remainder Physiographic Essays. The Educational Essays are largely devoted to the exploitation of the availability of physical geography for school and college work, and the arguments they include have been a large force in securing the place that physical geography has grown into in our higher

schools in the last fifteen years. It is significant that the latest article on physical geography included in the volume originally appeared in 1902 and that the article given first prominence in the volume, and dated 1906, gives less emphasis to physical geography and more to the wider outlook on geography from an educational standpoint that is constantly becoming more prominent in theory and practice.

The larger portion of the volume is devoted to the physiographic essays, several of which in their original appearance were epoch making and now classic standards. In order of appearance, and this order is roughly a history of the development of the physiography of the lands as a science, we have The Rivers and Valleys of Pennsylvania (1889); The Rivers of Northern New Jersey, with notes on the Classification of Rivers in General (1890); Plains of Marine and Sub-Aërial Denudation (1896); The Seine, The Meuse, and The Moselle (1896); The Geographical Cycle (1899); and The Peneplain (1899), followed by several others up to 1906. Those listed above, however, represent the several steps in the development of the modern accepted theory of land development and are basal in any study of the subject.

The volume is attractively printed, conveniently indexed and presented in a form worthy of the cause and the author. R. E. Dodge.

Geschichte der Erde und des Lebens. Von Johannes Walter, o. ö., Professor der Geologie und Palaeontologie an der Universität Halle. iv and 570 pp., and 355 Illustrations. Veit & Co., Leipzig, 1908. M. 14.

Persons who suspect geology of being a dry study ought to read this book. While the lay reader will find it fascinating, the scientist is compelled to admire the wonderful simplicity, clearness and unity of this presentation of our present knowledge of the beginnings and history of the globe, based upon the combined results of the earth sciences in the widest meaning of the term. A book like this is not a handbook proper nor a mere reference work however rich in references it actually is; it is a recreation of the matter itself through the scientific and artistic genius of its author.

In some aspects it reminds one of Suess's "Face of the Earth," without being so romantic; it restricts itself to what we, nowadays, accept as facts but arranges them in any way which leads thought beyond them. Little can be said about such a book in the way of introduction or criticism.

Its thirty chapters deal with (1) the properties of the earth; (2) geological forces; (3) the place of the earth in the solar system; (4) the formation of the moon and meteorites; (5) the formation, and subsequent changes, of the earth's crust; (6) the world ocean; (7) organic life; (8) atmosphere and climate; (9) the eruptive processes of the deep; (10) volcanism; (11) the development of earth history; (12) geological chronology; (13) the lower limit of the occurrence of fossils; (14) the traces of an Algonkian period; (15) the Cambrian; (16) halcyon days of animal development in the Silurian; (17) the old red Northland; (18) the Devonian Ocean; (19) the "Productus" seas; (20) the folding of the earth's crust and the formation of coal; (21) Godwanaland; (22) the Triassic seas; (23) the struggle of the northern desert with the Triassic seas; (24) the Jurassic seas; (25) the development of reptiles in North America; (26) the Cretaceous period and the great sway of death; (27) the Tertiary period;

(28) the Diluvial snow age; (29) prehistoric man; and (30) the course of the history of the earth.

This mere list of chapter heads is in itself an illustration of how far the trend of thought, and the interpretations of the author deviate from the old grooves of the traditional "course in geology." It is impossible in a short review to do justice to the many original points in the author's treatment of the various subjects. A few of the most interesting ones can only be mentioned.

I should like to draw special attention to the instructive way in which the thermo-plastic origin of the metamorphic rocks is explained as well as the formation of granites as a "cup of cinders" of the magma in which the basic components have sunk to the bottom—things which have been said before but hardly ever in a way comparable to the author's. Other chapters deserve the attention of the American student because the opinions expressed in them have not yet, to my knowledge, been adduced in American geological literature. Thus, for instance, the author's suggestion that rapid and frequent changes of facies in certain formations may be explained, not by as many oscillations of sea level, but rather by changes in the salinity of the respective seas, or by changes of the ocean currents which resulted in the transport and deposition of different deposits. The triassic sandstones, Professor Walther claims to be, for Germany at least, the product of a sand desert with shallow temporary lakes and pools, with short interludes of marine transgression, and a final overflooding by the Muschelkalk and Keuper seas. His arguments, too, in favor of a snow age in the place of the accepted ice age are worthy of notice.

As to the geological forces that produced the changes of the different periods, the author is as little an advocate of catastrophal theories as of perfect quietism. He says that, while on the whole, evolution went its way quietly through the different chapters of the earth's history, there must have been quasi "heroic" epochs, now and then, in which the action of geological and evolutional factors was accelerated, not by the increased activity of one of them but by the accidental, simultaneity of several series of causes whose effects not only added to, but also intensified, each other. Thus we see, at various times, that certain groups of plants or animals now one, now another, receive a certain impetus of a kind not now discernible to us, and begin to blossom out, as it were, into a profusion of both individuals and species. From the ontogenetic point of view, such periods of intensified vitality have an analogy, for example, in the life of the insect when, after long weeks and months of larval existence, it suddenly evolves into the butterfly. As normal phases in the development of species, these sudden climaxes should be called, not catastrophes, but anastrophes, and to discover the causes of this biological phenomenon the author designates as the paramount task of the geology of the future. He even hints at the possibility that the beginnings of life itself might be explained with the aid of a great anastrophe through which the indifferent initial forms suddenly developed new types, the ancestors of the living species of later ages.

The book, as has been said before, will be found full of interest for almost any reader; the layman will enjoy it as an epic of natural history; the novice in geology will prize it as one of the clearest expositions, from great points of view, of the problems of his chosen field; the mature student who has worked his way through the grind of the regular text book, will find it a new revelation on what he thought he knew, and the scholar and teacher will pay their respects to the

author who has shown what can be made of this subject by a master hand. It may not be amiss to say that no one with a tolerable reading acquaintance with scientific German need shrink from it for fear of linguistic difficulties. It is as readable as if it were a popular book, which I do not hesitate to set down as one of its merits. An extensive bibliography at the end of each chapter, an alphabetic index and three hundred and fifty-three illustrations of all kinds also facilitate its use. MARTHA KRUG GENTHE.

A Transformed Colony. Sierra Leona as it was, and as it is, its Progress, Peoples, Native Customs and Undeveloped Wealth. By T. J. Alldridge. xvi and 368 pp., 66 Illustrations, Map and Index. The J. B. Lippincott Company, Philadelphia, 1910. $3.50.

Mr. Alldridge was, for many years a British official in the Crown Colony of Sierra Leone. He is still the only man who has ever travelled around the entire area of what is now the Protectorate. In this interesting and authoritative book, he has pictured the past of Sierra Leone, as it really was; and then he tells of the wonderful transformation that has been brought about, the larger part of it within the past twelve years.

This book is representative of a new variety of works that is now being added to the literature on Africa. Four or five of these books have, thus far, appeared, and they could not have been written until this time. They contrast the former state of things with the present changed conditions. They sum up, thus far, the results of the mighty efforts that the white race has put forth to begin the regeneration of Africa and make the continent more useful to its peoples and to the world.

No part of barbarous Africa more strikingly illustrates the progressive movement than Sierra Leone. Mr. Alldridge shows how that region has been transformed from a lawless and slave-dealing country into one of security and freedom. The reign of terror has passed away. The chiefs no longer exercise autocratic power over life and death. The entire Hinterland is embraced in the Protectorate. An excellent railroad has helped to bring a region nearly as large as the State of New York under complete official control. Hospitals are multiplying, the elements of civilization, as we understand it, are taking root and the government policy is to teach the natives "the Gospel of the Carpenter Shop," as Bishop Ingham calls it. We cannot read such chapters as those describing the government school at Bo, the Sierra Leone R.R., the revolution in trade, the Princess Christian Hospital, and others, without believing that the new order of things is a wonderful boon to the million or two of natives in Sierra Leone. The book is well illustrated and contains an unusually good map of the Protectorate, considering that it can be only approximately accurate, as detailed surveys are still lacking.

Adrift on an Ice-Pan. By Wilfred Thomason Grenfell. xxvi and 69 pp., and Illustrations. Houghton Mifflin Company, Boston and New York, 1909. $0.75, net.

This is Dr. Grenfell's story of his drift on an ice floe that had broken away from land when he was sledge-travelling on a mission of mercy. He was alone with eight dogs, on an unsettled coast and his situation, for many hours, seemed hopeless. Relief came at last, but not till three of the dogs had given their lives

to save the man and their fellows. It is a record of endurance, courage and resourcefulness in the face of gravest peril and it shows the qualities that have enabled Dr. Grenfell to accomplish the work he has done.

Die Polarvölker. Von Dr. A. Byhan. 148 pp., 16 Plates, 2 Maps and Index. Quelle & Meyer, Leipzig, 1909. M. 1.25.

This little book, by one of the leading members of the staff of the Hamburg Ethnological Museum, will be counted among the useful works on the Arctic regions. Its topic is the material and intellectual life of the inhabitants of the high north. The space limits require concise treatment, but the prevalent and characteristic aspects of the tribes are clearly and methodically sketched. The lands they inhabit are briefly described and then the author treats of the various groups of peoples and their distribution, their clothing and ornaments, their habitations, industries, weapons, trade, means of communications, social organization, laws, customs, religion, games, arts, symbols or writings, and literature. The plates vividly reproduce many of the phases of life and occupation among the tribes; and the two maps show their distribution, the southern boundary of reindeer, etc.

The Canadian War of 1812. By C. P. Lucas. 269 pp., 8 Maps, and Index. The Clarendon Press, Oxford, 1906. 12s. 6d. [A careful compilation of the chapter in Canadian history dealing with the war of 1812 and derived, as far as possible, simply from the official despatches, on both sides, relating to the war. The maps are facsimiles of those which were used in this contest between the United States and Great Britain.]

Nel Darien e nell'Ecuador. Diario di Viaggio di un Naturalista. Dr. E. Festa. xvi and 397 pp., Maps, and Illustrations. Unione Tip.—Editrice Torinese, Turin, L.10. [A noteworthy book by a naturalist whose travels led him among the settlements of the south coast of Darien, the eastern province of Panama, and also into the heart of the Ecuadorian lowland, up the valley of the Rio Grande, and along the high plateau on which Quito stands. The author's observations on the flora, fauna, people and conditions of human life are of value. In conclusion, he gives a list of his zoological collections.]

Notes sur la Médicine et la Botanique des anciens Mexicains. Par A. Gerste, S.J. 161 pp., Appendix. Imprimerie Polyglotte vaticane, Rome, 1909. [The cost of publishing this careful compilation of all that is known of the medical régime and the botanical attainments of the ancient Mexicans, was borne by the Duc. de Loubat.]

Handbook of British Guiana 1909. Comprising General and Statistical Information concerning the Colony. Edited and Compiled by Geo. D. Bayley. xxv and 697 pp., Map., and Illustrations. Dulau & Co., London; J. H. Stark, Boston, 1909. 5s. [A handsome volume with many photo-engravings and a good map; the first work of the kind issued by British Guiana. It gives a good idea of the geography, population, mineral, agricultural and other resources, commerce, industries and other aspects of the colony.]

Chile. A Handbook Compiled by the International Bureau of American Republics. 235 pp., Map, Illustrations, and Index. Washington, 1909. [A well printed and handsomely illustrated handbook with a very good map of Chile made by Stanford, London. The work will be useful because it is a good com-

pendium of many kinds of facts relating to Chile. It is one of the best handbooks that the International Bureau has yet published.]

India. Romance of History. By Victor Surridge. xii and 308 pp., Map, 12 Illustrations from Original Drawings in Color, and Index. Frederick A. Stokes Company, New York, $2.00. [A book for popular reading in which the author attempts nothing more than to tell entertainingly the story of the more romantic events and picturesque incidents that marked the gradual evolution of India to its present position.]

Indian Pictures and Problems. Ian Malcolm. xiv and 294 pp., and 50 Illustrations. E. P. Dutton & Co., New York, 1907. Price, $3.00. [A book of travel, finely and copiously illustrated, descriptive of the India of to-day, with discussions on India problems, such as frontier questions, famine administration, etc.]

A Study of Nieve Penitente in the Himalaya. Paper No. 2. By William Hunter Workman. 27 pp., and Illustrations. Spottiswoode & Co., London, 1909. [Reprinted from the *Zeitschrift für Gletscherkunde*, May, 1909, with some additions. Describes the eight varieties of nieve penitente which Dr. Workman observed in the Nun Kun, Hispar, Biafo and Skoro regions. The fine photo-engravings help the description of these ice forms.]

Osservazioni preliminari sul Terremoto Calabro Messinese del mattino del 28 dicembre, 1908. G. Martinelli. 11 pp., and Map. Tip. S. Giuseppe degli Artigianelli, Turin, 1909. [This paper by Dr. Martinelli of the Osservatorio Geodinamico, Rome, records the phenomena observed at a large number of places within the seismic area, with much attention to the movements of the sea and the destruction caused by earthquake waves.]

Fenomeni sismici calabro-siculi precedenti il terremoto del 28 dicembre 1908. G. Martinelli. 24 pp., and Sketch Maps. Società Tipografica Modenese, Modena, 1909. [Gives instrumental records and discussion of the earth movements in the Calabria-Sicily area for several weeks preceding the earthquake of Dec. 28, 1908.]

An Explanation of the Adjustment of Ships' Compasses. By Commander L. W. P. Chetwynd. Second Edition. 24 pp., and Illustrations. J. D. Potter, London, 1909, 2s. [Deals concisely and without employing mathematical formulæ, with the various causes of the deviation of the compass and the methods of overcoming them.]

Lehrbuch der Paläozoologie. Von Prof. Dr. Ernest Freiherr Stromer v. Reichenbach. I. Teil: Wirbellose Tiere. x and 342 pp., 398 Illustrations, Diagrams, and Index. B. G. Teubner, Leipzig and Berlin, 1909. M. 10. [An introduction to palæozoology considered almost wholly apart from the geological relations of the fossils described. Dr. Stromer treats as clearly as possible, of the best-known results of zoological research, especially as relates to the classification, anatomy, life and distribution in time and space of the seven groups of animal organisms, from Protozoa to the Crustacea and other Arthropoda considered in this work. The descriptions are clear, the illustrations are excellent and each section closes with a bibliography.]

Erdkunde für Schulen. Von Alfred Kirchhoff. II Teil: Mittel und Oberstufe. Fifteenth Revised edition. viii and 411 pp., Illustrations, and Index. Verlag der Buchhandlung des Weisenhauses, Halle a. d. S., 1909. M. 3.40. [The latest revision of one of the best German text books of Geography.]

CURRENT GEOGRAPHICAL PAPERS

AMERICA

—— The Hardwoods of the Americas. Spanish Cedar or Cedrela. Ills. *Bull.* Intern. Union of Amer. Reps., Dec., pp. 1051-1060, 1909.

—— The Wool Industry in the Americas. Ills. *Bull.* Intern. Bureau Amer. Reps., March, pp. 385-409, 1910.

NORTH AMERICA

BELL, ROBERT. The Hudson Bay Route to Europe. Maps and Ills. *The Scott. Geog. Mag.*, Vol. 26, No. 2, pp. 67-76, 1910.

United States

ALLEN, R. C. The Occurrence and Origin of the Brown Iron Ores of Spring Valley, Wisconsin. Sketch Map and Ills. *Eleventh Report* of the Mich. Acad. of Sci., Darwin Centen. Pub., pp. 95-103, 1909.

ASHLEY, GEORGE H. The Value of Coal Land. *Bull.* 424, Value of Public Coal Lands, U. S. Geol. Survey, pp. 5-47, Washington, 1910.

BEAL, W. J. The Rapid Extension of Weeds in Michigan. *Eleventh Report* of the Mich. Acad. of Sci., Darwin Centen. Pub., pp. 33-36, 1909.

BUSHNELL, DAVID I. The Choctaw of Bayou Lacomb, St. Tammany Parish, Louisiana. *Bull.* 48, Bur. of Amer. Ethnol., 35 pp., Maps, Ills., and Index. Smithsonian Inst., Washington, 1909.

DART, RICHARD. Settlement of Green Lake County. *Proc.* of the State Hist. Soc., 57th Annual Meeting, 1909, pp. 252-272, Madison, 1910.

DARTON, N. H. Geology and Underground Waters of South Dakota, Maps and Ills. *Water-Supply Paper* 227, 156 pp., U. S. Geol. Surv., Washington, 1909.

DOLE, R. B. The Quality of Surface Waters in the United States. Part 1: Analyses of Waters East of the One Hundredth Meridian. *Water-Supply Paper* 236, U. S. Geol. Survey, 123 pp., Washington, 1909.

EMMONS, WILLIAM H. A Reconnaissance of some Mining Camps in Elko, Lander, and Eureka Counties, Nevada. *Maps. Bull.* 408, U. S. Geol. Survey, 130 pp., Washington, 1910.

FARIS, R. L. Distribution of the Magnetic Declination in Alaska and Adjacent Regions for 1910. Map. Appendix No. 4, Report for 1909, pp. 153-179, Coast and Geol. Survey, 1910.

FENNEMAN, N. M. Physiography of the St. Louis Area. Maps and Illustrations. *Bull.* No. 12, Illinois State Geol. Survey, 83 pp., Urbana, University of Illinois, 1909.

FISHER, CASSIUS A. Depth and Minimum Thickness of Beds as Limiting Factors in Valuation. (Coal.) *Bull.* 424, The Valuation of Public Coal Lands, pp. 48-75, U. S. Geol. Survey, 1910.

HUDSON GEORGE H. Some Items Concerning a New and Old Coast Line of Lake Champlain. Ills. *Museum Bull.* 133, Fifth Report, Director Sci. Div., pp. 159-163, Albany, 1909.

LEIGHTON, HENRY. One Hundred Years of New York State Geologic Maps 1809-1909. Map, List of Maps and Index. *Museum Bull.* 133, New York State Museum, Fifth Report Sci. Div., pp. 115-155, Albany, 1909.

MERRIAM, C. HART. Report of the Chief of the Bureau of Biological Survey for 1909. From Annual Report of the Dep. of Agric., 23 pp., Washington, 1909.

MILLER, W. J. Geology of the Port Leyden Quadrangle, Lewis County, N. Y. *Museum Bull.* 135, Educ. Dep. Bulletin, No. 463, 58 pp., Map, Illustrations, and Index. Albany, 1910.

RATHBUN, RICHARD. Report on the Progress and Condition of the U. S. National Museum for the Year Ending June 30, 1909. U. S. Nat. Museum, Smithsonian Institution, 141 pp., Washington, 1909.

SAPIR, EDWARD. Yana Texts. Together with Yana Myths Collected by R. B. Dixon. Univ. of Cal. Pub. in *Amer. Archaeol. and Ethnol.*, Vol. 9, No. 1, pp. 1-235, Berkeley, 1910.

SCHRADER, F. C. Mineral Deposits of the Cerbat Range, Black Mountains, and Grand Wash Cliffs, Mohave County, Arizona. *Bull.* 397, U. S. Geol. Sur., 226 pp., Maps and Ills., Washington, 1909.

SMITH, H. I. A Visit to the Indian Tribes of the Northwest Coast. Ills. *The Amer. Museum Jour.*, Vol. 10, No. 2, pp. 31-42, New York, 1910.

—— Decisions of the United States Geographic Board, rendered Feb. 2, 1910.

—— Thirtieth Annual Report of the Director of the United States Geological Survey for 1909. Dep. of the Interior, U. S. Geol. Survey, 128 pp. and Maps, Washington, 1909.

Canada

PETERSON, C. W. Irrigation in its Relation to Agriculture and Colonization. [Western Canada.] Maps and Ills. *United Empire*, Vol. 1 (New Series), No. 2, pp. 87-115, 1910.

—— Canada's Fertile Northland. A Glimpse of the enormous Resources of Part of the Unexplored Regions of the Dominion. Evidence Heard Before a Select Committee of the Senate during Parliamentary Session of 1906-7. 139 pp., Ills. and a Case of Maps. Government Printing Bureau, Ottawa, 1907.

—— Geographic Board of Canada. Decisions January, 1910. 7 pp., Canada Gazette, Jan. 29, 1910.

Mexico

LEAL, PROF. M. Algunos Datos para el Estudio del Regimen de los Vientos en Leon, Guanajuato. Diagrams. *Mem. y Rev.* de la Soc. Cientif. "Antonio Alzate," Vol. 25, Nos. 9-12, pp. 257-287, 1909.

OROPESA, G. M. El Ferrocarril Nacional de Tehuantepec y los Puertos de Coatzacoalcos y Salina Cruz. Ills. *Memorias y Revista* de la Soc. Cientif. "Antonio Alzate," Vol. 25, Nos. 9-12, pp. 307-318, 1909.

CENTRAL AND SOUTH AMERICA

LEMAIRE, DR. M. N. Los Lagos de los Altiplanos de la América del Sud. Dirección Gen. de Estadíst. y Estud. Geog., 154 and civ pp., Illustrations and Maps. La Paz, 1909.

—— Lardner Gibbon's Explorations in South America. Map, Ills. *Bull.* Intern. Bureau of Amer. Reps., March, pp. 448-458, 1910.

—— Der erste Anden-Durchstich. Ills. *Kosmos*, Vol. 2, No. 3, pp. 39-41, 1910.

—— Some Aspects of Exploration in Central South America. Ills. *Bull.* of the Intern. Union of Amer. Reps., Dec., pp. 1062-80, 1909.

Costa Rica

—— Republica da Costa Rica. Oficina Nacional de Estadística. Anuario de 1908. Anexo á la Memoria de Fomento de 1908. Vol. 12, 364 pp., 1909.

Argentina

—— Argentine International Trade. A few Figures on its Development. Div. of Commerce and Industry, 26 pp., Buenos Aires, 1909.

Bolivia

Bowman, Isaiah. The Highland Dweller of Bolivia: An Anthropogeographic Interpretation. Reprint from the *Bull.* of Geog. Soc. of Phila., Vol. 7, No. 4, 26 pp., and Ills., 1909.

Hartwig, Alfredo. Die Grenze zwischen Perú und Bolivia. *Geog. Zeitsch.*, Vol. 16, No. 1, pp. 46-50, 1910.

Brazil

—— Brazil's New Port [Rio Grande do Sul]. Maps and Ills. *Bull.* Intern. Bureau of Amer. Reps., March, pp. 410-423, 1910.

Venezuela

—— Trade of Venezuela in 1908-9. *The Board of Trade Jour.*, Vol. 68, No. 691, p. 385, 1910.

AFRICA

Abyssinia

Bieber, F. J. Durch Südäthiopien zum Nil. Ills. *Globus*, Vol. 97, No. 5, pp. 70-74 and No. 6, pp. 85-90, 1910.

Algeria, Morocco and Tunis

Clémentel. Le Recrutement des Indigènes en Algérie et dans l'Afrique occidentale française. Ills. *Renseign. Colon.*, Vol. 20, No. 1, pp. 13-15 and No. 2, pp. 46-51.

—— El Mercado de Fez. *Bol.* de la Real Soc. Geog. Vol. 6, No. 12, pp. 465-470, 1909.

—— Tunisie: La Frontière Tripolitaine. *Rev.* Franç. de l'Étrang. et des Col., Vol. 35, No. 374, pp. 89-92, 1910.

Central Africa

Serve, Louis. La Question des Transports dans la Brousse africaine; le Haquet monocycle. Ill. *A travers le Monde*, Vol. 16, No. 8, pp. 61-62, 1910.

East Africa

Jaeger, Dr. Fritz. Forschungen in den Hochregionen des Kilimandscharo. Map, Profiles, and Ills. *Mitt.* aus den Deutsch. Schutzgeb., Vol. 22, Nos. 2 and 3, pp. 113-146 and 161-197, 1909.

Uhlig, Prof. Dr. Carl. Die Ostafrikanische Bruchstufe und die angrenzenden Gebiete zwischen den Seen Magad und Lawa ja Mweri sowie dem Westfuss des Meru. Wissenschaftliche Ergebnisse der Ostafrikanischen Expedition der Otto Winter-Stiftung. Teil 1: Die Karte. Ergänzungsheft No. 2, *Mitt.* aus d. deutsch Schutzgeb., 63 pp. and Maps, 1909.

Egypt and the Sudan

Audebeau Bey, Charles. Étude hydrographique et agricole sur la Région des Bararis. *Bull.* de l'Institut Égyptien, Series 5, Vol. 3, No. 1, pp. 42-50, 1909.

Craig, J. I. The Prediction of Nile Floods. Reprinted from "The Cairo Scientific Journal," No. 34, Vol. 3, 7 pp., Alexandria, 1909.

Lyons, Capt. H. G. The Rains of the Nile Basin and the Nile Floods of

1907. Survey Dep. Paper No. 9, 60 pp., Maps and Diagrams, Sur. Dep. Egypt, Cairo, 1909.

Equatorial West Africa

STANTON, MAJOR A. E. Khartoum and the Sudan. United Empire, Vol. 1 (New Series), No. 3, pp. 183-197, 1910.

MANN, DR. OTTO. Bericht, betreffend die Ergebnisse einer Untersuchung des Vulkanausbruches im Kamerungebirge im April-Mai 1909. Sketch Map and Ills. *Mitt.* aus den Deutsch. Schutzgeb., Vol. 22, No. 4, pp. 277-284, 1909.

ROHRBACH, DR. PAUL. Prinzipielle Grundsätze zur deutschen Kolonialwirtschaft im tropischen Westafrika. *Deutsche Geog. Blätter,* Vol. 32, No. 4, pp. 129-146, 1909.

—— Ergebnisse der meteorologischen Beobachtungen in Togo im Jahre 1908. *Mitt.* aus den deutsch. Schutzgeb., Vol. 22, No. 3, pp. 270-276, 1909.

—— Ergebnisse der Regenmessungen in Kamerun im Jahre 1908. *Mitt.* aus den Deutsch. Schutzgeb., Vol. 22, No. 4, 1909.

—— Guinea española. Contra las colonias penitenciarias. *Bol.* de la Real Soc. Geog., Vol. 6, No. 12, pp. 449-453, 1909.

Nigeria

MARC, L. AND R. CHUDEAU. Mopti et le Commerce du Moyen Niger. Sketch Map and Ills. *Annales de Géog.,* Vol. 19, No. 103, pp. 42-48, 1910.

MOUREY, CHARLES. La Question de l'Alcool dans la Nigeria méridionale. Le rapport de la commission d'enquête. *L'Afrique Franç.,* Vol. 19, No. 2, pp. 58-60, 1910.

—— Trade of Southern Nigeria (Lagos) in 1909. *Board of Trade Jour.,* Vol. 68, No. 691, p. 384, 1910.

Sahara

FERRANDI, LIEUT. J. Les Oasis et les Nomades du Sahara oriental. Map and Ills. *Renseign. Colon.,* Vol. 20, No. 1, pp. 3-8 and No. 2, pp. 38-45, 1910.

MARQUARDSEN, DR. H. Oberflächengestaltung und Hydrographie des saharisch-sudanischen abflusslosen Gebiets. Map and Diagrams. *Pet. Mitt.,* Vol. 56, No. 1, pp. 14-20, 1910.

—— Neue Kämpfe der franzosen in der zentralen Sahara. *Deutsch Kolonialzeit.* Sonderbeilage, Vol. 27, No. 4, p. 68, 1910.

South Africa

BERTHOLD, HANS. Einiges über Schafzucht in Südafrika. *Der Tropenpflanzer,* Vol. 14, Nos. 1 and 2, pp. 21-29 and 63-74, 1910.

CHIAPPINI, C. DU P. The Fresh Fruit Export Trade. *The Agric. Jour. of the Cape of Good Hope,* Vol. 36, No. 1, pp. 65-109, 1910.

GENSCHOW, LIEUT. Das Paresis-Gebirge. Map. *Mitt.* aus den Deutsch. Schutzgeb., Vol. 22, No. 4, pp. 295-298, 1909.

GRAY, C. J. Report on the Mining Industry of Natal for the Years 1907 and 1908. 93 pp., Maps and Diagrams. Times Printing and Pub. Co., Pietermaritzburg, 1909.

HELY-HUTCHINSON, THE RIGHT HON. SIR WALTER. The South African Outlook. *United Empire,* Vol. 1 (New Series), No. 3, pp. 161-182, 1910.

SINGELMANN, KARL. Die Angola-Mittelandbahn. *Kolon. Zeitsch.,* Vol. 11, No. 3, pp. 50-51, 1910.

—— Deutsche Frauen in Deutsch-Südwestafrika. *Deutsche Kolonialzeit.* Sonderbeil., Vol. 27, No. 4, pp. 66-67, 1910.

—— Die Diamantlagerstätten in Südwest-Afrika. Map. *Pet. Mitt.,* Vol. 56, No. 1, pp. 22-23, 1910.

—— Transvaal Mines Department. Report of the Geological Survey for the Year 1908. 173 pp., Maps, Profiles, Illustrations and Index. Pretoria, 1909.

—— Zur südwestafrikanischen Diamantenfrage. *Deutsche Kolonialz.,* Sonderbeil., Vol. 27, No. 4, pp. 65-66, 1910.

African Islands

DOELTER, DR. C. Os Vulcões das Ilhas de Cabo Verde e os seus productos. Profile and Ills. *Bol.* da Soc. de Geog. de Lisboa, Nos. 2-11, 1909.

ASIA

Asiatic Turkey

HANDEL-MAZZETTI, DR. H. FREIH. V. Ergebnisse einer botanischen Reise in das Pontische Randgebirge im Sandschak Trapezunt. *Annal.* des k. k. Naturhistor. Hofmuseums, Vol. 23, Nos. 1-2, pp. 6-236, 1909.

LANZONI, ADRIANO. La Mesopotamia economica. *Boll.* della Soc. Geog. Italiana, Series 4, Vol. 11, No. 1, pp. 23-37, Rome, 1910.

——Nordpalästina. [Economic Condition.] *Monatschrift für den Orient,* Vol. 36, No. 1, pp. 1-2, 1910.

Central Asia

MERZBACHER, PROF. G. *Moia novaiia Tian-shanskaiia ekspedixia,* 1907-1908. [Latest Tian-Shan Expedition.] Izviestia Imp. Russian Geog. Soc., Vol. 45, Nos. 1-3, pp. 1-20, 1909.

PILIPENKO, P. P. *K voprosu o lednikovom periodie na Altaie.* [Glacial-Period in Altai.] Résumé in German. Ills. *Annuaire* Géol. et Minéral. de la Russie, Vol. 12, Nos. 1-2, pp. 1-7, 1910.

China

CHAZARAIN-WETZEL, DR. P. La Vallée du Namti, oú passe le Chemin de fer du Yun-Nan. Map and Ills. *À travers le Monde,* Vol. 16, No. 8, pp. 57-60, 1910.

DENIKER, J. Exploration du lieut.-col. Kozlov en Mongolie et dans le Sseutch'ouan. *La Géog.* Vol. 21, No. 1, pp. 27-33; 1910.

LEGENDRE, DR. A. F. Far West Chinois. Races aborigènes.-Les Lolos.-Etude ethnologique et anthropologique. T'Oung Pao, Vol. 10, Series 2, Nos. 3, 4 and 5, pp. 340-380, 399-444 and 603-665, 1909.

OBRUTSCHEW, PROF. W. A. Reise im Barlyk, Maili und Djair im Sommer 1909. *Pet. Mitt.,* Vol. 56, No. 1, pp. 21-22, 1910.

OLLONE, VICOMTE D'. Le chemin de fer du Yunnan. Son avenir. *Rev. Franç. de l'Étranger et des Col.,* Vol. 35, No. 374, pp. 68-81, 1910.

—— Calendrier-Annuaire pour 1910. 2e année de Siuen-Tong. (8e année.) Observatoire de Zi-ka-wei. Impr. de la Mission Catholique, Shanghai, 1909.

—— Analysis of Foreign Trade. Vol. 1. Imports. Returns of Trade and Trade Reports (44th Issue) 1908. Statistical Series, Nos. 3 and 4, Part 3, 268 pp. Shanghai, 1909.

Dutch East Indies

COOL, HUGO. De Landschappen Malili en Noeha in het N. O. van de Golf van Boni. Map and Ills. *Tijdschrift* van den Koninklijk Nederl. Aadrijkskundig Genootschap, Vol. 27, No. 1, pp. 107-127, 1910.

DONGEN, G. J. VAN. De Koeboes in de Onderafdeeling Koeboestreken der Residentie Palembang. Map. *Bijdragen* tot de Taal-Landen Volkenkunde van Nederlandsch-Indië, Series 7, Part 9, pp. 181-336, 1910.

JONGH, G. J. J. DE. De Oostkust van Noord-Halmahera. Map. *Tijdschrift* van het Kon. Nederl. Aardrijkskundig Genootschap, Vol. 26, No. 5, pp. 747-772, 1909.

Indo-China

AYMÉ-MARTIN. Les chemins de fer au Laos. Map. Soc. de Géog. Commerc. de Paris, Vol. 31, No. 11, pp. 697-718, 1909.

TIXIER, CAPT. Note sur l'orographie de l'Indo-Chine française. Sketch Maps. *La Géog.*, Vol. 20, No. 6, pp. 337-348, 1909.

Japan

DENING, WALTER. Confucian Philosophy in Japan. Reviews of Dr. Inoue Tetsujirō's three Volumes on this Philosophy. *Trans.* of the Asiatic Soc. of Japan, Vol. 36, Part 2, pp. 101-152, 1908.

HALL, J. C. Japanese Feudal Laws: II.—The Ashikaga Code. *Trans.* of the Asiatic Soc. of Japan, Vol. 36, Part 2, pp. 1-23, 1908.

VISSER, DR. M. W. The Tengu. *Trans.* of the Asiatic Soc. of Japan, Vol. 36, Part 2, pp. 1-98, 1908.

—— Extension Work on Japanese Government Railways in 1909. *The Board of Trade Jour.*, Vol. 68, No. 691, pp. 386-388, 1910.

Siberia

SIBIRIAKOFF, A. Von Ljapin nach Tobolsk. *Deutsche Geog. Blätter*, Vol. 32, No. 4, pp. 147-154, 1909.

AUSTRALASIA AND OCEANIA

HADDON, A. C., W. H. R. RIVERS, C. S. MEYERS, AND OTHERS. Sociology, Magic and Religion of the Eastern Islanders. Vol. VI. of the Reports of the Anthropological Expedition to Torres Straits. xx and 316 pp., and Illustrations. Cambridge University Press, 1908.

GOOSZEN, A. J. Land en Volk van Zuid Nieuw-Guinea. *Tijdschrift* Kon. Nederl. Aardrijskundig Geonootschap, Vol. 26, No. 5, pp. 793-800, 1909.

GRAEBNER, F. Zur australischen Religionsgeschichte. Eine kritisch-methodische Studie. *Globus*, Vol. 96, Nos. 23 and 24, pp. 362-366 and 373-378, 1909.

GULLETT, HARRY S. Australia's Golden Fleece. Ills. *United Empire*, Vol. 1 (New Series), No. 2, pp. 74-85, 1910.

MCCALL, JOHN. Tasmania: Its Resources and Future. *Journal* Royal Col. Instit., Vol. 41, Part 1, No. 1, pp. 21-35, 1909.

VAUPEL, F. Apia, Samoas Hauptstadt. Ills. *Deutsch Kolonialz.*, Vol. 27, No. 3, pp. 38-40, 1910.

—— Aus den Schutzgebieten der Südsee. Ergebnisse der Regenmessungen im Jahre 1908. *Mitt.* aus den Deutsch. Schutzgeb., Vol. 22, No. 4, pp. 299-304, 1909.

—— The New Zealand Official Year-Book 1909. (Eighteenth Year of Issue.) 890 pp. and Index. Wellington, 1909.

EUROPE

ALT, DR. E. Die geographische Verteilung der Gewitterhäufigkeit in Kontiental und Nordeuropa. Map. *Pet. Mitt.*, Vol. 56, No. 1, pp. 5-7, 1910.

Austria-Hungary

HASSINGER, DR. HUGO. Beiträge zur Siedlungsund Verkehrsgeographie von Wien. Mitt. d. k. k. Geog. Gesellsch. in Wien, Vol. 53, No. 1, pp. 5-88, 1910.

RUDNYCKYĬ, DR. STEFAN. Die Landeskundliche Literatur der bojischen Länder Österreichs (Böhmen und die bojischen Anteile von Nieder und Oberösterreich, Mähren und Schlesien) in den Jahren 1897-1907. *Geog. Jahresbericht aus Österreich*, pp. 195-219, Vienna, 1909.

SAWICKI, L. Die Verteilung der Bevölkerung in dem Westkarpaten im allgemeinen. Map. *Bull. Intern.* de l'Acad. des Sciences, No. 9, pp. 886-905, Cracaw, 1909.

Bulgaria

CAUCHY, L. Une jeune Capitale qui grandit: Sophia en 1909. Ills. *Le Tour du Monde*, Vol. 16, No. 9, 1910.

—— Statistique Agricole (Ensemencements et Récolte) pour l'année 1906 et pour l'anné 1907. In 2 Vols. In French and Bulgarian. Direction Gén. de la Statis., 74 pp. in each Vol., Sofia, 1909, 1910.

France

ANGOT, A. AND P. LEMOINE. Le Tremblement de Terre du 11 Juin 1909 dans le sud-est de la France. Enquête du Bureau Central Météorologique. Maps and Ills. *Annales de Géog.*, Vol. 19, No. 103, pp. 8-25, 1910.

DEMANCHE, G. Rochefort et la défense navale. Map. *Rev.* franç. de l'Etrang. et des Col., Vol. 35, No. 374, pp. 81-87, 1910.

FLUSIN, G. AND JACOB, CH. Travaux topographiques et glaciologiques dans le massif des Grandes-Rousses. Ills. *La Géog.*, Vol. 21, No. 1, pp. 1-20, 1910.

GUÉRIN-GANIVET, J. Notes préliminaires sur les Gisements de Mollusques comestibles des Côtes de France, La côte Morbihannaise de la rivière d'Etel à l'anse de Kerguelen. Map. *Bull.* de l'Institut Océanogr., No. 155, 15 pp. Monaco, 1909.

LEGENDRE, R. Recherches physico-chimiques sur l'eau de la côte à Arcachon. Ills. *Bull.* de l'Institut Océanog., No. 158, 26 pp., 1910.

RICHARD, J. AND L. SIRVENT. Liste des Opérations faites dans les parages de Monaco à bord de l'Eider et du Sténo pendant les années 1907, 1908, 1909. Map and Ills. *Bull.* de l'Institut Océanogr., No. 160, 153 pp. 1910.

Germany

BAYBERGER, PROF. DR. FRANZ. Zum Problem des Wellheimer Trockentals. Map. *Mitt.* der Geog. Gesellsch. in München, Band 4, No. 2, pp. 179-233, 1909.

PESSLER, DR. WILLI. Richtlinien zu einem Volkstums-Atlas von Niedersachsen. Ein Ethno-geographisches Programm. 14 pp., Hannover, 1909.

—— Die Abhängigkeit der deutschen Eisenindustrie von ausländischen Erzen. *Export*, Vol. 32, No. 5, pp. 63-65, 1910.

Italy

GREIM, G. Die Veränderungen am Vesuv in Folge des Ausbruchs vom April 1906. Maps and Profiles. *Geog. Zeitsch.*, Vol. 16, No. 1, pp. 1-12, 1910.

MARTINELLI, G. La Sismicità all'isola di Ustica e il Periodo Marzo-Aprile 1906. Separate from the Annali dell' Ufficio Cent. Meteor. e Geodin. Italiano, 16 pages and Maps. Rome, 1910.

SOMMIER, S. L'isola di Pianosa nel Mar Tirreno. Ills. *Rivista Geog. Ital.*, Vol. 16, Nos. 8, 9, and 10, pp. 441, 528 and 585, Florence, 1909.

Montenegro

HAVASS, DR. REZSŐ. Antivari und die neue Montenegrinische Bahn. Ills. *Bull.* of the Hungar. Geog. Soc., Intern. Edit., Vol. 37, Nos. 1-2, pp. 20-35, Budapest, 1909.

Russia

MEYEN, V. F. *Rossia v Doroznom Otnoszenii.* [Means of Communication in Russia. Railroads, Stone and Common Roads and Waterways.] Maps for each Government. 3 Vols. Agricultural Dep., Ministry of the Interior, St. Petersburg, 1902.

—— Baku Naphtha Industry in 1909. *The Board of Trade Jour.*, Vol. 68, No. 691, p. 402, 1910.

Scandinavia

—— Wirtschaftliches aus den skandinavischen Ländern. *Export*, Vol. 32, No. 7, pp. 91-92, 1910.

Spain

LÓPEZ, FACUNDO CAÑADA. Plan de un Estudio Geográfico-Estadístico de la Provincia de Murcia. Map. *Bol.* de la Real Soc. Geog., Vol. 7, No. 1, pp. 5-20, 1910.

POLAR REGIONS

MELDAU, PROF. DR. H. Über Ortsbestimmung im Polargebiete. *Deutsche Geog. Blätter*, Vol. 32, No. 4, pp. 155-159, 1909.

PETERS, W. J. Time and Direction at the Poles of the Earth. *Terrestrial Magn. and Atmosph. Electr.*, Vol. 14, No. 4, pp. 187-188, 1909.

SHACKLETON, SIR ERNEST. Au Cœur de l'Antarctique. Ills. Translation and adaptation by Ch. Rabot. Le Tour du Monde, Vol. 16, Nos. 1-8, 1910.

ANTHROPOLOGY

—— Zentralblatt für Anthropologie. [Bibliography and Reviews of Current Anthropology.] Vol. 14, in 6 Nos., Braunschweig, 1909.

BIBLIOGRAPHY

LEE, JOHN T. A Bibliography of Carver's Travels. *Proc.* of the State Hist. Soc. of Wis., 57th Annual Meeting, 1909, pp. 143-183, Madison, 1910.

VASCONCELLOS, ERNESTO DE. Exposição Parcellar. [Catalogue of appliances in the "Museum Colonial" used for land and river transportation.] Ills. Soc. de Geographia de Lisboa, 1909.

—— Sveriges Offentliga Bibliotek. Stockholm. Upsala. Lund. Götenborg. Accessions-Katalog. 22. 1907. [Bibliography of accessions, including Geography, Archaeology and Anthropology.] 523 pp., Stockholm, 1908-9.

ECONOMIC GEOGRAPHY

BETTS, H. S. Properties and uses of the Southern Pines. Circular 164, Forest Service, 29 pp. U. S. Dep. of Agric., 1909.

BROWN, ROBERT M. The Change of Response due to a Changing Market. *The Jour. of Geog.*, Vol. 8, No. 6, pp. 121-128, 1910.

DOVE, PROF. DR. K. Ziele und Aufgabe der Verkehrsgeographie. *Pet. Mitt.*, Vol. 56, No. 1, pp. 1-5, 1910.

MATHEMATICAL GEOGRAPHY

CRAIG, J. I. Map Projections. Technical Lecture No. 3, 1908-09, 25 pp., 2 Appendixes, Maps and Ills., Survey Dep. Egypt, Cairo, 1909.

ECKARDT, DR. W. R. Die Pendulationstheorie und die geologischen Klimate. *Pet. Mitt.*, Vol. 56, No. 1, p. 20, 1910.

HETTNER, A. Die Eigenschaften und Methoden der kartographischen Darstellung. *Geog. Zeitschr.*, Vol. 16, No. 1, pp. 12-28, 1910.

TILHO, JEAN. Sur la précision des déterminations de longitude à terre, par le transport du temps, à l'aide des montres de torpilleur. (Mission Niger-Tchad.) *La Géog.*, Vol. 21, No. 1, pp. 34-37, 1910.

—— Die astronomisch-geodätischen Arbeiten des k. u. k. Militärgeographischen Institutes in Wien. XXII Band. Astronomische Arbeiten. 10 Polhöhen- und Azimuth-Messungen auf den Stationen Brassó, Castei, etc. Sketch Map. 461 pp., Budapest, 1908.

—— Leistungen des k. u. k. Militärgeographischen Instituts im Jahre 1908. *Mitt.* des k. u. k. Militärgeog. Institutes, Vol. 28, for 1908, 68 pp., and 6 Maps. Vienna, 1909.

PHYSICAL GEOGRAPHY

BAUER, L. A. Some of the Problems of Ocean Magnetic Work. Ills. *Terres. Magn. and Atmosph. Electr.*, Vol. 14, No. 4, pp. 161-176, 1909.

ECKHARDT, DR. W. R. Die Theorie von Polverschiebungen und ihre Bedeutung für das paläothermale Problem, insbesondere die diluviale Eiszeit. Map. *Globus*, Vol. 97, No. 6, pp. 91-94, 1910.

FARIS, R. L. Results of Magnetic Observations made by the Coast and Geodetic Survey between July 1, 1908, and June 30, 1909. Appendix No. 3—Report for 1909, pp. 77-149, 1910.

GALLÉ, P. H. Zur Kenntnis der Meeresströmungen. *Communic. and Transac.* of the Koninklijk Neder. Meteorol. Institut, No. 102.9, 26 pp. and Maps, Utrecht, 1910.

HILDEBRANDSSON, H. H. Quelques Recherches sur les centres d'action de l'atmosphère. III: Sur la compensation entre les types des saisons simultanées en différentes régions de la terre. Diagrams. 11 pp. Stockholm, 1909.

KUCHINSKI, E. A. Magnetic Storm observed on Sept. 25, 1909, at the Constantin Observatory at Pavlovsk, the most intense since the beginning of Observations. [In Russian.] *Izviestiia* of the Imp. Academy of Sciences, No. 2, pp. 137-152, St. Petersburg, 1910.

SADERRA, MASÓ. REV. MIGUEL. Seismic Epicenters near Western Mindanao and Jolo. *Bull.*, Weather Bureau, Manila Central Observatory, pp. 203-207, June, 1909.

ZANOTTI-BIANCO, OTTAVIO. La Gravità alla Superficie del Mare e l'ipotesi di Pratt. *Riv. Geog. Ital.*, Vol. 17, Nos. 1-2, pp 1-46, 1910.

—— Observations météorologiques faites d'après le système international, dans les stations de 2 ordre en Russie. Année 1906. *Annales* de l'Observ. phys. central Nicolas. Part 2 in 2 Nos. *Annales* de l'Observatoire physique central Nicolas, St. Petersburg, 1909.

GENERAL

HENDERSON, BERTHA. The Modern Trend of Geography. *The Jour. of Geog.*, Vol. 8, No. 6, pp. 129-134, 1910.

HOVEY, E. O. Darwin Memorial Celebration. [Address delivered on Feb. 12, 1909.] *Annals* of the New York Acad. of Sci., Vol. 19, Part 1, pp. 1-40, 1909.

MASSÁNY, DR. E. VON. Ballon-und Drachenbeobachtungen über den Ozeanen. *Bull.* of the Hungarian Geog. Soc., Intern. Edit., Vol. 37, Nos. 1-2, 1909.

REED, CHARLES B. The Masters of the Wilderness: A Study of the Hudson's Bay Company from Its Origin to Modern Times. Map. Chicago Historical Soc., pp. 137-173, 1909.

RÉTHLY, ANTAL. Über Bergobservatorien. Ills. *Bull.* of the Hungarian Geog. Soc., Intern. Edit., Vol. 37, Nos. 1-2, pp. 3-7, 1909.

NEW MAPS

NORTH AMERICA

U. S. GEOLOGICAL SURVEY MAPS

ALASKA. (a) Relief Map of Central Alaska, showing distribution of Mineral Resources. 1 inch=120 miles. (b) Geologic Map of Kasaan Peninsula, Prince of Wales Island. 1 inch=1.57 mile. (c) Geologic Map of Copper Mt. Region, Prince of Wales I. 1 inch=1.25 mile. (d) Preliminary Map showing mineral resources of Prince William Sound Region and adjacent Territory from Resurrection Bay to the Copper River Delta. 1 inch=12 miles. [Symbols for copper, gold and antimony mines and prospects.] (e) Map of Southwestern Alaska showing distribution of known mineral deposits. 1 inch=70 miles. (f) Geologic Sketch Map of Cook Inlet region. 1 inch=68 miles. (g) Geologic Map of Coal Harbor Coal Field, Unga I. 1 inch=4.5 miles. (h) Map of the Region of the Wrangell and Nutzotin Mts. 1 inch=15 miles. [Symbols for mineral locations and trail.] (i) Geologic Map of Fairbanks District. 1 inch=2.6 miles. (k) Map showing distribution of Mineral resources in Iron Creek Region, Seward Pen. 1 inch=2.15 miles. [All black maps.] Bull. 379, "Mineral Resources of Alaska. Report on Progress of Investigations in 1908," by A. H. Brooks and others, Washington, 1909.

ALASKA. (a) Reconnaissance Map of the Middle Kuskokwim and Lower Yukon Regions 1:625,000=9.88 miles to an inch. [Brown contours.] (b) Geologic Sketch Map of the Innoko, Central Kuskokwim and lower-central Yukon Regions. 1 inch=45 miles. (c) Sketch Map of the Innoko Placer District. 1 inch=7 miles. Interval, 500 feet. (d) Map of the Ruby Creek District. 1

inch=4 miles. Interval, 200 feet. (e) Map of the Gold Hill District. 1:250,000= 3.95 miles to an inch. Interval, 200 feet. [All colored maps.] *Bull.* 410 "The Innoko Gold-Placer District. Alaska, with Accounts of the Central Kuskokwim Valley and the Ruby Creek and Gold Hill Placers," by A. G. Maddren, Washington, 1910.

ARIZONA. (a) Geologic Reconnaissance Map of a part of Western Arizona. 1:250,000=3.95 miles to an inch. 34° 40′-36° N.; 113° 30′-114° 45′ W. Interval, 250 feet. [Formations in colors, distribution of mines, prospects, etc.] (b) Map showing Mining Camps in a part of western Arizona. 1 inch=18 miles. [Black map.] In *Bull.* 397, "Mineral Deposits of the Cerbat Range, Black Mts. and Grand Wash Cliffs, Mohave Co., Arizona," by F. C. Schrader, Washington, 1909.

NEVADA. (a) Geologic Map of an Area in Northeast Nevada. 1 inch=5 miles. 40°-41° 28′ N.; 116°-117° W. [A part of the Great Basin. Geological coloring.] (b) Four Topographic Maps of each quarter of above area. 1 inch=5 miles. [Brown Contours and hill shading.] In *Bull.* 408. "A Reconnaissance of some Mining Camps in Elko, Lander, and Eureka Cos., Nevada," by William H. Emmons. Washington, 1910.

UNITED STATES. (a) Preliminary Geologic Map of a Part of Maine, showing Locations of Feldspar Quarries and Mills. 1 inch=13 miles; (b) Generalized Geologic Map of S. E. Pa. and adjacent Parts of Del. and Md., showing location of Feldspar Quarries and Mills. 1 inch 312 miles. With *Bull.* 420, "Economic Geology of the Feldspar Deposits of the U. S.," by Edson S. Bastin. (In colors.)

U. S. HYDROGRAPHIC OFFICE CHARTS

Pilot Chart of the North Atlantic Ocean, April, 1910.

Pilot chart of the South Atlantic Ocean, June, July and August, 1910. [Based upon the researches made and data collected by Lieut. M. F. Maury.]

DEPARTMENT OF AGRICULTURE MAPS

UNITED STATES. Soil Survey Maps of Autauga, Calhoun and Jefferson Cos., Ala.; Monroe Co., Miss.; Western North Dakota; Northwestern Pa. Various Scales. [In colors with descriptive text.]

WEATHER BUREAU CHARTS

Meteorological Charts of the North Atlantic Ocean, April and May, 1910.

Meteorological Charts of the North Pacific Charts, April and May, 1910.

ALASKA. (a) The Pacific Coast of the Gulf of Alaska. 1 inch=80 miles; (b) Relief Map of Malaspina Glacier, Mt. St. Elias, and Yakutat Bay. No scale. By Lawrence Martin; (c) Lower part of Hubbard Glacier with 3 Swiss glaciers superimposed. 1 inch=2 miles. (d) Malaspina Glacier. 1 inch=19 miles; (e) The Columbia Glacier, Prince William Sd. 1 inch=0.9 mile; (f) Valdez Glacier Highway. 1 inch=6 miles; (g) Glaciers of lower Copper R. and Controller Bay Regions. 1 inch=9 miles; (h) Atrevida, Lucia and Marvine Lobe of Malaspina Glacier. 1 inch=$\frac{1}{2}$.5 miles; (i) Variegated and Haenke Glaciers. 1 inch=5 miles. Illustrate paper on Glaciers in the Regions of Yakutat Bay, eastern Prince William Sound and the Lower Copper River by Ralph S. Tarr and Lawrence Martin. *Nat. Geog. Mag.*, No. 1, 1910. [All

except the relief map are black sketches based, in part, upon the U. S. Geol. Surv. topographic sheets.]

MISSOURI-ILLINOIS. Topography and Areal Geology of the St. Louis Quadrangle. 1:62,500=0.9 mile to an inch. Geology by N. M. Fenneman and J. C. Jones. Surveyed in cooperation with the U. S. Geological Survey. In *Bull.* 12, of the Ill. State Geol. Surv., "Physiography of the St. Louis Area," by N. M. Fenneman, Urbana, Ill., 1909.

NEW JERSEY. Altitude and location Map of the Palisades Region from Bergen Point to Piermont. I inch=1.75 mile. Illustrates "The Palisades of the Hudson," by Arthur C. Mack. The Palisade Press, Edgewater, N. J., 1909. [A serviceable, black sketch map.]

WEST VIRGINIA. Marshall, Wetzel and Tyler Cos. 3 maps. (a) Topography; (b) General and Economic Geology; (c) Agricultural Soils. 1:62,500=0.9 mile to an inch. West Virginia Geological Survey, Morgantown, 1909. [Accompany Reports for 1909. Excellent maps based upon the topographic sheets of the U. S. Geol. Surv.; the agricultural soils sheet prepared in cooperation with the U. S. Dept. of Agriculture.]

WEST VIRGINIA. Ohio, Brooke and Hancock Cos. 8 maps. (a) Topographic Map; (b) Agricultural Soils; (c) Hancock Co., Geologic Map; (d) Hancock Co., Geologic Outcrops; (e) Brooke Co., Geologic Map; (f) Brooke Co., Geologic Outcrops; (g) Ohio Co., Geologic Map; (h) Ohio Co., Geologic Outcrops. 1:62,500=0.9 mile to an inch. West Virginia Geological Survey, Morgantown, 1906. [Accompany County Reports for 1906.]

CANADA. Standard Topographical Map. Michipicoten Sheet (Thunder Bay, Algoma and Sudbury Districts.) 1:500,000=7.89 miles to an inch. Dep't. of the Interior., R. E. Young, Chief Geographer, Ottawa, 1910.

SOUTH AND CENTRAL AMERICA

PANAMA. Regioni del Darien percorse dal Dott. Enrico Festa. 1:150,000=2.38 miles to an inch. Illustrates "Nel Darien e nell' Ecuador, by Dr. Festa. [A map in colors of the S. E. coast region of the Republic of Panama.]

AFRICA

EGYPT. Map of Egypt. 1:750.000=11.84 miles to an inch. 6 sheets. Survey Department, Cairo, 1909. [In colors. The irrigation canals and the extent of cultivated lands are conspicuous features. Heights above sea level in meters, and towns, north of Aswan, indicated on a population basis. Desert routes, wells, railroads, lighthouses and much other information, all adapting the map for school or general purposes.]

RHODESIA. Map of Rhodesia. 1 inch=60 miles. With inset of South Africa. Directors' *Report* of the British South Africa Co., for Year ending March 31, 1909. London, 1910. [Colored for political divisions, railroads, telegraphs, etc. The Cape to Cairo R.R. and telegraph are shown as completed to Katanga in the Belgian Congo.]

ASIA

ASIA. Physical and Political School Map of Asia (in Arabic). With Political and Orographical Insets. 4 Sheets. Survey Department, Cairo, 1909. [A large

wall map prepared by the Egyptian government for use in native schools. Shades of brown for land elevations and three tints of blue for sea depths. The map compares favorable with similar school products of Europe.]

EUROPE

ENGLAND. Plan of Norwich. 6 inches=1 mile. John Bartholomew & Co., Edinburgh, 1910. [Printed in 5 colors and based on the Ordnance Survey Map.]

GERMANY. Gang der Besiedlung and Grundrissformen der Orte. 1:200,000= 3.15 miles to an inch. With paper by Max Bolle. "Beiträge zur Siedlungskunde des Havelwinkels" in *Mitt.* d. Sächsisch-Thüringischen Ver. f. Erdkunde, Vol. 33, Halle a S., 1909. [In colors, showing the development of Slavic and German towns from the 7th to the middle of the 19th centuries, in the angle between the Elbe and its tributary, the Havel.]

SCOTLAND. Bartholomew's "Quarter-Inch to Mile" Map of Scotland. Sheets 4, Glasgow and Oban; 5, Forth and Tay; 6, Galloway and Lower Clyde; 7, Border Country. 1:253,440=4 miles to an inch. John Bartholomew & Co., Edinburgh, 1910. 1 s. a sheet, folded in cover. [Fine specimens of cartography, specially designed for touring motorists. The clear and bold style of engraving make it convenient for ready reference on the road. Ten tints to show contours of elevation. Roads plainly differentiated according to quality.]

SWITZERLAND. (a) Die Bevölkerungsdichte des Bern. Mittellandes; (b) Die Siedelungsdichte des Bern. Mittellandes. 1:200,000=3.15 miles to an inch. With paper by Oscar Bieri, "Volksdichte u. Besiedelung d. bernischen Mittellandes." In *Jahresbericht* d. Geog. Gesells. von Bern, Vol. 21, 1906-7. Bern, 1909. [In colors.]

POLAR

GREENLAND. Geological Map of a part of the East Coast of Greenland. 1:2,000,000=31.56 miles to an inch. 69° 20′-75° 12′ N.; 19° 50′-32° W. From the work of the Second German Polar Expedition, the Expeditions of Ryder and Nathorst and the Observations during the Amdrup-Hartz Greenland Expedition. Compiled by Otto Nordenskjöld. Illustrates "On the Geology and Physical Geography of East Greenland" by Otto Nordenskjöld. Reprinted from "Meddelelser om Grönland," Vol. 28. Bianco Luno, Copenhagen, 1908. [A fine map of the sea and fiord coasts with 14 geological tints, from the Archaean rocks to Quarternary deposits. An inset gives generalized geologic sections along lines shown on the map in 1:1,000,000 with about 10 fold exaggeration of the vertical scale.]

ATLASES

ATLAS UNIVERSEL DE GÉOGRAPHIE. Ouvrage commencé par M. Vivien de Saint-Martin et continué par Fr. Schrader. No. 47, Asie en 10 Feuilles. Feuille 2; Turkestan. 1:5,000,000=78.9 miles to an inch. 35°-50° 55′ N.; 48°-86° E. of Paris. Hachette & Co., Paris, 1909. 2 frs. [The latest and a very fine generalization of the data relating to Turkestan. Russian and the northern part of Chinese Turkestan are based upon the southern part of the Russian government map of Asiatic Russia, by Gen. Bolcheff, in 1:1,680,000. The Yarkand Daria and its affluents are taken largely from Dr. Sven Hedin's maps. There will be 90 sheets in this notable altas of which 10 are still to be produced.]

ATLAS COLONIAL PORTUGUÊS. 2nd Edition. Ministerio da Marinha e Ultramar, Lisbon, 1909. [11 maps in colors, various scales, showing the Portuguese colonies with unusually large nomenclature.]

OTHER ACCESSIONS

AMERICA

BALLOU, MATURIN M. The New Eldorado. A Summer Journey to Alaska. Boston, Houghton, Mifflin & Co. (1889.) 8vo.

BALLOU, MATURIN M. Due South, or, Cuba Past and Present. 8th Edition. Boston, Houghton, Mifflin & Co. 1895. 8vo.

DUFFIELD, A. J. Peru in the Guano Age, being a short Account of a . . . Visit to the Guano Deposits, etc. London, Richard Bentley & Son. 1877. 8vo.

GUROWSKI, ADAM G. DE. America and Europe. New York, D. Appleton & Co. 1857. 12mo.

HULBERT, ARCHER BUTLER—(Editor). Index to the Crown Collection of Photographs of American Maps, etc. Selected and edited by ———. Index. Cleveland, Privately printed by The Arthur H. Clark Co. 1909. 8vo.

(HUNTINGTON, H. JR.) A View of South-America and Mexico, comprising their History, the Political Condition, etc., etc. By a Citizen of the United States. Two Volumes in one. [Portrait.] New-York, Pub. by H. Huntington, Jr. 1825. 12mo.

JAMES, BUSHROD WASHINGTON. Alaska. Its Neglected Past, Its Brilliant Future. (Maps, etc.) Philadelphia, Sunshine Pub. Co. 1897. 8vo.

MOLINA, F. Memoir on the Boundary Question pending between the Republic of Costa Rica and the State of Nicaragua. [Map.] Washington, Gideon & Co., Prts. 1851. 8vo. pr.

NOLTHENIUS, R. P. J. Tutein.—Nieuwe Wereld. Indrukken en Aanteekeningen Tijdens eene Reis door de Vereenigde Staten van Noord-Amerika. [Maps.] Haarlem, H. D. Tjeenk Willink & Zoon. 1900. 8vo.

PALACIO, DIEGO GARCIA DE. Amtlicher Bericht des Licenciaten —— an den König von Spanien über die centralamerikanischen Provinzen San Salvador und Honduras im Jahre 1576. Aus dem Spanischen . . . . von A. von Frantzius. [Karte.] Berlin, Dietrich Reimer. 1873. sm. 4to, pr.

PARKER, A. A. Trip to the West and Texas. Comprising a Journey of Eight Thousand Miles through New-York, Michigan, ... 1834-5 . . . . Sketch of the Texian War. 2nd Edition. [Frontispiece.] Concord, N. H., William White. 1836. 12mo.

PARKER, NATHAN H. The Iowa Handbook for 1857. With a New and Correct Map. Boston, John P. Jewett & Co. 1857. 12mo.

PARKER, NATHAN H. The Minnesota Handbook, for 1856-7. With a New and Accurate Map. [Map.] Boston, John P. Jewett & Co. 1857. 12mo.

RAFN, CHARLES C. America Discovered in the Tenth Century. New York, William Jackson. 1838. sm. 4to, pr.

WALLACE, SUSAN E. The Land of the Pueblos. [Illustrated.] New York, George D. Hurst. (1888.) 8vo.

CANADA. Gazetteer of the Province of Upper Canada: to which is added, An Appendix, describing the principal Towns, . . . in Lower Canada. (Plan.) New-York, Prior & Dunning. 1813. sm. 4to, pr.

AFRICA

DUNNING, H. W. To-Day on the Nile. Photogravures, [& Map]. London, Gay & Bird. 1907. 8vo.

WET, CHRISTIAAN RUDOLF, DE. Three Years' War. Frontispiece by John S. Sargent. Map, etc. New York, Charles Scribner's Sons. 1902. 8vo.

ASIA

CHILD, JACOBS T. The Pearl of Asia. Reminiscences of the Court of a Supreme Monarch, or, Five Years in Siam. (Illustrations.) Chicago, Donohue, Henneberry & Co. 1892. 8vo.

GERINI, G. E. Researches on Ptolemy's Geography of Eastern Asia, etc. Published in Conjunction with the Royal Geographical Society. *Asiatic Society Monographs No. I.* (Maps.) London, 1909. 8vo.

NIEUWENHUIS, A. W. In Centraal Borneo. Reis van Pontianak naar Samarinda. *Uitgegeven door de Maatschappij . . Natuurkundig Onderzoek der Nederlandsche Koloniën.* 2 Vols. [Illustrated.] Leiden, E. J. Brill. 1900. 8vo.

EUROPE

TROLLOPE, THOMAS ADOLPHUS. A Lenten Journey in Umbria and the Marches. London, Chapman & Hall. 1862. 8vo.

OCEANIA

YOUNG, LUCIEN. The Real Hawaii. Its History and Present Condition, including the True Story of the Revolution. (*A Revised and Enlarged Edition of "The Boston at Hawaii."*) (Maps, etc.) New York, Doubleday & McClure Co. 1899. 8vo.

GENERAL

BRASSEY, LORD. Voyages and Travels of ———, from 1862 to 1894. Arranged and Edited by Captain S. Eardley-Wilmot. 2 Vols. (Maps.) London, Longmans, Green & Co. 1895. 8vo.

CARNES, J. A. Journal of a Voyage from Boston to the West Coast of Africa, etc. Boston, John P. Jewitt & Co. 1852. 12mo.

JORDAN, DAVID STARR, et al. The Fur Seals and Fur-Seal Islands of the North Pacific Ocean. Parts 3 & 4. (2 Vols.) (Maps, etc.) Washington, Gov't. Print. Office. 1898-1899. 8vo. *Gift.*

SENN, NICHOLAS. Around the World via Siberia. From Articles that Originally Appeared in the Chicago Tribune and Reprinted by Permission of the Author. (Illustrations.) Chicago, W. B. Conkey Co. (1902.) 8vo.

[BIBLIOGRAPHY.] American Book-Prices Current. A Record of Books, MSS., and Autographs sold at auction in New York, Boston, and Philadelphia, from Sept. 1, 1908, to Sept. 1, 1909, with the prices realized. Compiled . . . by Luther S. Livingston. New York, Dodd, Mead & Co. 1909. 8vo.

DICTIONARY, Icelandic-English. Based on the MS. Collections of the Late Richard Cleasby. Enlarged and Completed by Gudbrand Vigfusson. With an Introduction . . . by George Webb Dasent. Oxford, Clarendon Press. 1874. 8vo.

ENCYCLOPÆDIA OF RELIGION AND ETHICS. Edited by James Hastings . . . With the assistance of John A. Selbie, . . . and other Scholars. Vol. II: Arthur-Bunyan. New York, Charles Scribner's Sons. 1910. 4to.